Source-1

Microwave Sweep Generator
Temporary Operation Manual

Integra Microwave

VLH

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MICROWAVE

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JUNE, 1987

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Integra Microwave
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SOURCE-1
MICROWAVE SWEEP GENERATOR
OPERATING INSTRUCTIONS

The Integra Microwave Source-1 microwave sweep generator is a microprocessor controlled instrument capable of being operated from the front panel or via the rear panel IEEE-488 interface.

1.0 Front Panel Operation.

All functions of the Source-1 can be controlled from the front panel using the numeric keypad or the knob. The instrument makes extensive use of menus and prompts on the alphanumeric display. During mode selection, menus are displayed and the operator may scroll through the selections in both directions by turning the knob. When the desired mode or parameter is displayed it can be selected by pressing the <ENTER> button or the selection may be aborted by pressing the <CLEAR> button. On some menus a direct access mode is provided which allows the operator to go directly to the function without scrolling through the menu. This is useful in changing modes quickly once the commands have been learned. On these menus the direct access key is indicated in brackets after the selection (example: Center / Delta F <3>). To make this selection the operator could press the <MODE> key, turn the knob clockwise untill the deside prompt is displayed, and then press <ENTER>; or he could just press <MODE> followed by the 3 key. Through out the remainder of this document this sequence will be expressed in the following format: <MODE> <3>
The extensive use of menus allows a new operator the begin using the instrument without constantly refering to the manual. Most of the operating modes can be accessed through these menus.

1.1 Front Panel Controls.

1.1.1 KNOB.

The front panel knob is used for multiple functions. In mode selection menus it is used to scroll forward and backward through the menu selections. For parameter entry it is used to increment or decrement the current value of the parameter.

1.1.2 NUMERIC KEYPAD.

The numeric keypad is used to enter parameter values and select operating modes. When entering a numeric parameter the last digit entered may be cleared by pressing the <-> key.

1.1.3 ENTER.

The <ENTER> button is used to select the current choice from a

menu, advance the cursor to the next parameter on the display, or enter a new value into a parameter from the numeric key pad. If an entry has been made from the key pad the <ENTER> button enters the value. If no numbers have been pushed the cursor will advance to the next parameter on the display. The cursor appears as an arrow in place of the equal sign for the parameter.

1.1.4 CLEAR.

The <CLEAR> button also has several uses. If a numeric key has been pressed it will abort the entry and return the old parameter value to the display. If in a mode menu or preview mode the <CLEAR> button will abort the selection and return the display to the last operating mode. When the cursor is on Power, CW Filter, or a Marker parameter pressing the <CLEAR> button will toggle the function between on and off. If the cursor is on CW frequency or F0 (manual sweep mode) pressing the button will cause a hysteresis reset of the YIGs for improved frequency accuracy. In the Triggered Sweep mode the sweep is started by placing the cursor on the TSp prompt and pressing <CLEAR>. In this mode it is also used to abort a sweep and start a retrace.

1.1.5 POWER.

The <POWER> button is used to toggle the RF power between on and off in all operating modes. In some mode menus it is used to select a mode of operation.

1.1.6 MODE.

The <MODE> button selects the main mode menu. When first displayed the menu will indicate the current operating mode. At this point the operator may scroll through the menu in either direction by turning the knob. When the desired mode is reached the <ENTER> button is pushed to select the mode. If the mode number is known, that mode may be selected directly by pushing that number directly. To abort mode selection, press the <CLEAR> button. The following is a list of the available modes with their direct access selection keys.

F1 to F2 Sweep	<1>
CW Mode	<2>
Center / Delta F	<3>
.5V/GHz Extrn Sweep	<4>
Default Parameters	<5>
Select GPIB Setup	<6>
Store Set-up	<7>
Recall Set-up	<8>
Secure Mode Select	<0>
Secondary Parameters	<.>
Display/Sel Markers	<->
Leveling Mode	<POWER>

1.1.6.1 F1 to F2 Sweep Mode.

The F1 to F2 sweep mode (<MODE> <1>) provides a capability to sweep between two frequency end points (F1 and F2) over the range of 2 to 20 GHz. The default parameters displayed are F1, F2, Sweep speed in seconds, and Power out. When in this mode the secondary parameters available are:

Internal Sweep (Speed)
Manual Sweep (F0)
External Sweep
Triggered Sweep (Speed)
RF Power
RF Breakpoint Freq
Marker #1
Marker #2
Marker #3
Marker #4
Remove Parameter

The secondary parameters may be viewed in the F1 to F2 sweep mode by pressing <MODE> <.> and turning the knob. Internal sweep, Manual sweep, External sweep, and Triggered sweep are considered sub-modes and are discussed in detail later in this document. The secondary parameters selected in this mode will also be selected in the Center / Delta F Mode. The RF Breakpoint Frequency and RF Power settings will remain the same for all modes.

1.1.6.2 CW Mode.

The CW mode (<MODE> <2>) provides a mode to manually control the output on a fixed frequency over the range of 2 to 20 GHz. The frequency is controlled in 1 MHz steps via front panel keypad or knob entry. The default parameters dipslayed are CW frequency, RF Power out, CW Filter status, and RF Breakpoint Frequency. When in this mode the secondary parameters available are:

CW Filter
RF Breakpoint Freq
Remove Parameter

The secondary parameters may be viewed in the CW mode by pressing <MODE> <.> and turning the knob. The RF Breakpoint Frequency and RF Power settings remain the same for all modes.

1.1.6.3 Center / Delta F Sweep Mode.

The Center / Delta Frequency sweep mode (<MODE> <3>) provides a capability to sweep over a Delta Frequency range about a Center frequency. The default parameters displayed are CF (Center Frequency), DF (Deltal Frequency), Sweep speed in seconds, and Power out. When in this mode the secondary parameters available are:

Internal Sweep (Speed)
Manual Sweep (F0)
External Sweep
Triggered Sweep (Speed)
RF Power
RF Breakpoint Freq
Marker #1
Marker #2 .
Marker #3
Marker #4
Remove Parameter

The secondary parameters may be viewed in the Center / Delta Frequency sweep mode by pressing <MODE> <.> and turning the knob. Internal sweep, Manual sweep, External sweep, and Triggered sweep are considered sub-modes and are discussed in detail later in this document. The secondary parameters selected in this mode will also be selected in the F1 to F2 Sweep Mode. The RF Breakpoint Frequency and RF Power settings will remain the same for all modes.

1.1.6.4 .5V/GHz External Sweep Mode.

The .5V/GHz External Sweep Mode (<MODE> <4>) is used to provide a means to control the output frequency with an external voltage source over the range of 2 to 20 GHz with 2 GHz at 1 volt and 20 GHz at 10 volts. When in this mode the secondary parameters available are:

CW Filter
RF Power
RF Breakpoint Freq
Remove Parameter

The secondary parameters may be viewed in the .5V/GHz External Sweep mode by pressing <MODE> <.> and turning the knob. The RF Breakpoint Frequency and RF Power settings remain the same for all modes.

1.1.6.5 Default Parameters.

Default Parameters (<MODE> <5>) is not an operating mode. Its function is to reset all of the operating parameters and modes to the default settings. The stored set-ups are not affected. The default settings are:

Mode:	F1 to F2 Sweep (Internal Sweep)
F1 (Start Freq.):	2 GHz
F2 (Stop Freq.):	20 GHz
Swp & TSp (Sweep spd):	0.100 Sec
Po (RF Power):	0.00 dBm (On)
Fb (Breakpoint Freq.):	4 GHz
F0 (Manual Swp):	11 GHz

```
CF (Center Freq.):        11 GHz
DF (Deltal Freq.):        2 GHz
CW (Frequency):           11 GHz
M1 (Marker 1):            5 GHz (Off)
M2 (Marker 2):            8 GHz (Off)
M3 (Marker 3):            11 GHz (Off)
M4 (Marker 4):            14 GHz (Off)
Fltr (CW Filter):         On
```

1.1.6.6 Select GPIB Mode.

The GPIB Select Mode (<MODE> <6>) provides a means to view and/or change the IEEE-488 address and emulation modes. When first selected the bus address is displayed and a choice of <ENTER>=New or <CLEAR>=OK is presented. If <ENTER> is pressed the operator is prompted for a new address. The number entered must be between 0 and 30. Press <ENTER> following the number. Next the emulation mode select menu is displayed. The choices are: Integra GPIB Mode and 8350 Emulation Mode. The selection is made by turning the knob untill the desired mode is displayed and then pressing <ENTER>. The instrument will then return to the current operating mode.

1.1.6.7 Store Set-up.

Store Set-up (<MODE> <7>) allows the operator to store the current operating modes and parameters in non-volitile memory for later recall. All parameters for all modes (including non selected modes) are stored in the memory register. There are ten storage registers available (0 to 9). To store the current set-up select the Store Set-up Mode and the screen will display:

```
Store Set-up, Select #
```

At this point press the number of the desired register and the set-up will be stored. The display will then return to the current operating mode.

1.1.6.8 Recall Set-up.

Recall Set-up (<MODE> <8>) allows the operator to recall set-ups stored in the registers using the Store Set-up mode. After selecting Recall Set-up the screen will display:

```
Recall Set-up, Select #
Press <.> for Preview
```

To recall a register for operation with the stored parameters and and modes press the number of the storage register. The unit will then display the stored mode and parameters and begin operation in that mode. To preview the stored set-ups without entering that mode press the <.> key. The display will show:

```
Preset Review Mode
select 0-9, Pwr = Off
```

At this point the RF power is turned off. To view the stored set-ups either press the number of the storage register or turn the knob untill the desired register is displayed. The register number is displayed in the lower right corner of the screen. To output the current parameters press <POWER>. The instrument will remain in the Preview Mode and operate in the the displayed mode. The operating set-up may be changed by scrolling through the set-ups with the knob or by pressing the number keys. In this mode the parameters can not be changed. At this point the output power may be toggled off and on with the <POWER> button. To return to normal operation in the displayed mode press <ENTER>. To return to the last operation mode press <CLEAR>.

1.1.6.9 Secure Mode Select.

Secure Mode Select (<MODE> <0>) provide a means to select a secured display, secured front panel, change the password, or clear memory. When the mode is selected a menu will be displayed with the following selections:

```
Secure Mode Select:<ENT>

Secure Display    <POWER>
Secure Front Panel   <->
Change Password      <1>
Clear Memory Presets <.>
```

The desired selection may be made by pressing the button in brackets or by turning the knob and pressing <ENTER> when the desired selection is displayed. To abort the selection process at any time press <CLEAR>.

1.1.6.9.1 Secure Display Mode.

The Secure Display Mode (<MODE> <0> <POWER>) blanks the screen and displays the message:

```
*** SECURED DISPLAY ***
```

In this mode all front panel controls are disabled and no parameters are displayed. The instrument will continue to operate in the last mode selected. To exit the Secure Display mode press (<MODE> <0> <.>). The operator will then be prompted for the password. As the password is keyed asterisks (*) will be displayed for each number keyed (four digits). After keying the password press <ENTER>. If the correct password is entered the unit will return to normal operation in the current mode. If an incorrect password is keyed the screen will flash:

```
*** PASSWORD ERROR ***
```

Followed by:

<CLEAR> aborts
<ENTER> reset memory

Pressing <CLEAR> will return to the Secure Display mode and allow the operator to try again. Pressing <ENTER> will clear all of memory including all parameters and stored set-ups. The operator will then be prompted for a new password. This provides an escape if the password is forgotten or lost.

1.1.6.9.2 Secure Front Panel Mode.

In the Secure Front Panel Mode (<MODE> <0> <->) all front panel controls are disabled. The instrument will continue to operate in the last mode selected and display the parameters. To exit the Secure Front Panel mode press (<MODE> <0> <.>). The operator will then be prompted for the password. As the password is keyed asterisks (*) will be displayed for each number keyed (four digits). After keying the password press <ENTER>. If the correct password is entered the unit will return to normal operation in the current mode. If an incorrect password is keyed the screen will flash:

*** PASSWORD ERROR ***

Followed by:

<CLEAR> aborts
<ENTER> reset memory

Pressing <CLEAR> will return to the Secure Front Panel mode and allow the operator to try again. Pressing <ENTER> will clear all of memory including all parameters and stored set-ups. The operator will then be prompted for a new password. This provides an escape if the password is forgotten or lost.

1.1.6.9.3 Change Password Mode.

The Change Password Mode (<MODE> <0> <1>) allows the operator to change the current password without affecting any stored parameters or set-ups. After selecting this mode the operator will be prompted for the old password. After the old password is keyed correctly, followed by <ENTER> the screen will prompt for a new password. Key the desired password followed by <ENTER>. If the old password is keyed incorrectly the screen will flash:

*** PASSWORD ERROR ***

Followed by:

<CLEAR> aborts
<ENTER> reset memory

Pressing <CLEAR> will return to the last operating mode and allow the operator to try again. Pressing <ENTER> will clear all

of memory including all parameters and stored set-ups. The operator will then be prompted for a new password. This provides an escape if the password is forgotten or lost.

1.1.6.9.4 Clear Memory Presets Mode.

The Clear Memory Preset mode (<MODE> <0> <.>) provided to clear all parameters and stored set-ups from memory. The unit will be re-initialized to the default parameters. When the mode is select the screen will display:

```
* Clear Memory Setups  *
<ENTER>,  <CLEAR> Aborts
```

Pressing <ENTER> will proceed with clearing memory, pressing <CLEAR> will abort and return to the last operating mode.

1.1.6.10 Secondary Parameters.

Selecting Secondary Parameters (<MODE> <.>) will display a menu of the available secondary parameters in the current operating mode. These parameters are listed in the section describing the current operating mode. The desired selection may be made turning the knob and pressing <ENTER> when the desired selection is displayed. To abort the selection process at any time press <CLEAR>. After selecting a new secondary parameter the value will be displayed on the bottom left of the screen. The parameter previously in that position will be moved to the right side of the display replacing the any parameter displayed there. The instrument will then return to normal operation. When in F1 to F2 Sweep or Center / Delta F mode, selecting Internal Sweep, Manual Sweep, External Sweep, or Triggered Sweep will also change the sweep mode to the one selected.

1.1.6.10.1 Internal Sweep Mode.

When the Internal Sweep Mode is selected the instrument will continuously sweep over the programed frequency range at the displayed sweep rate. The sweep time can be programed from .02 to 120 seconds using the numeric keypad or the knob. This parameter is also used in the triggered sweep mode. The default value is 0.100 Seconds.

1.1.6.10.2 Manual Sweep Mode.

When the Manual Sweep Mode is selected the operator controls the output over the programed frequency range by adjusting the F0 frequency. The default value is 11 GHz.

1.1.6.10.3 External Sweep Mode.

When the External Sweep Mode is selected the sweep is controlled over the programed frequency range by an external voltage with a range of 0 to 10 volts.

1.1.6.10.4 Triggered Sweep Mode.

When the Triggered Sweep Mode is selected the instrument will sweep from the beginning frequency to the end frequency each time it is triggered. Before the sweep is started the output will be at the start frequency with the power on and the pen will be lifted. To trigger the sweep, place the cursor on the TSp parameter by repeatedly pressing <ENTER>. Enter the desired sweep time. The sweep time can be programed from .02 to 120 seconds using the numeric keypad or the knob. The default value is 0.100 Seconds. This parameter is also used in the internal sweep mode. After the value is set press the <CLEAR> button to start the sweep. The pen will drop and the sweep will start. The screen will display:

```
***     SWEEPING     ***
   <CLEAR> to Abort
```

Pressing <CLEAR> will abort the sweep and return the output frequency to the start. When the sweep is finish the sweep will stop, the pen will be lifted, and the screen will display:

```
***    Sweep Done    ***
<CLEAR> to Retrace Sweep
```

Pressing <CLEAR> will retrace the sweep to the start frequency. The output power will be off during the retrace. The instrument is then ready for a new sweep.

1.1.6.10.5 RF Power.

The RF Power parameter is used in all modes. It can be set over the range of -15 to +20 dBm using the numeric keypad or knob. The default value is 0 dBm. If the power is off the display will indicate Po=OFF. The power may be toggled between on and off with the <POWER> button or by placing the cursor on the parameter and pressing <CLEAR>.

1.1.6.10.6 RF Breakpoint Frequency.

The RF Breakpoint Frequency is used in all modes. It can be set over the range of 4 to 10 GHz using the numeric keypad or knob. The default value is 4 GHz.

1.1.6.10.7 Markers.

The Markers are available in the Internal Sweep and Triggered Sweep modes only. There are four markers. Each one may be programed over the range of 2 to 20 GHz using the numeric keypad or knob and may be turned on or off separately. To enable or disable a marker, place the cursor on the marker and press the <CLEAR> button to toggle between on and off. Placing the cursor on the marker will cause it to become the active marker on the

external display. Markers may also be accessed through the Display/Sel Markers mode (<MODE> <->).

1.1.6.10.8 CW Filter.

The CW Filter is available in the CW, Manual Sweep, External Sweep, and .5V/GHz External Sweep modes only. The filter may be controlled by placing the cursor on it and pressing the <CLEAR> button to toggle between on and off. The filter may be directly controlled (even if not selected on the display) by pressing (<MODE> <.> <->). The filter is automatically switch in or out if the mode is changed.

1.1.6.10.9 Remove Parameter.

Remove Parameter is used to blank out the secondary parameter displayed on the lower left side of the display. If selected twice both parameters will be blanked.

1.1.6.11 Display/Select Markers.

The Display/Select Markers mode (<MODE> <->) will display all four markers on the screen and allow the frequencies to be programed over the range of 2 to 20 GHz using the numeric keypad or knob and may be turned on or off separately. To enable or disable a marker, place the cursor on the marker and press the <CLEAR> button to toggle between on and off. Placing the cursor on the marker will cause it to become the active marker on the external display. Markers may also be accessed as secondary parameters (<MODE> <.>).

1.1.6.12 Leveling Mode.

The Leveling mode (<MODE> <POWER>) provides a means to select Internal, External Detector, or External Meter power leveling. When selected the the following menu will be displayed:

```
Leveling Mode Sel: <ENT>

Internal Leveling
Ext. Detector Leveling
Ext. Meter Leveling
```

The second line of the display will display the current selected mode. The other modes may be displayed by turning the knob. When the desired mode is displayed it is selected by pressing <ENTER>. The screen will then return to the current mode of operation.

Integra Microwave
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SOURCE-1
IEEE-488 PROGRAMMING GUIDE

1.0 Introduction

This programming guide is intended to provide the necessary programming information to remotely control the Integra Microwave Source-1 Sweep Generator via the rear panel IEEE-488-1978 interface. This guide is assumes that the user is familiar with IEEE-488 programing, the language of the controller to be used, and the basic functions of the Source-1 Sweep Generator. For operating instructions refer to the Source-1 Operators Manual.

1.1 Input Commands

The Source-1 responds to programming codes which control all front panel functions except the Line switch and the set GPIB commands for address and emulation mode. The instrument is capable of recognizing two sets of commands. The set in use may be selected from the front panel through the Select GPIB Mode menu. These command sets consist of an Integra Mode and a HP-8350 Emulation Mode.

2.0 Integra Mode

The Integra Mode is designed to use a flexible English language format to provide a easy to learn command set for inexperienced users. The commands consist of a key word which may be followed by an equals sign and a number if a parameter is to be changed. Many of the commands will respond to more than one key word and many of the key words may shortened or abbreviated to a short numonic. For example the sweep start frequency (F1) may be expressed as START=2.000, STA=2.000, or F1=2.000. All of these commands will produce the same result. In addition all commands respond to the same identifier prompt that is displayed on the Source-1 display. This means that all parameters may be programmed by using the same format as is shown on the display for that parameter.

2.1 Input Syntax

2.1.1 Parameter Entry

All parameters must start will an identifier string, followed by an equals sign and a number. The beginning sequence of characters in the identifier must match one of the specified parameter codes or it will be ignored. However the input code may contain more characters than are specified after its minimum code and before the equals sign. For example: Start frequence is defined as F1 or STA in the command table. Only F1 or STA is required in a command. The unit will accept STARTFREQUENCY=2.000 because is

begins with STA. The numeric value must be in the same format and units as the value displayed on the front panel display. The decimal point is assumed after the last digit if not used. Zeros after the decimal point are not needed. Each command must end with a delimiter. More than one command may be contained in each message separated by delimiters. Delimiter are Line Feed (LF), semicolon (;), comma (,), or EOI.

```
HP 85 Basic Example: 10 OUTPUT 719;"F1=2.000;F2=20"
```

2.1.2 Force Set-up Command

The Force Set-up command is used to preset the instrument to a previous set-up condition. It consists of 57 bytes of binary data terminated with an EIO. This message is obtained by storing the data returned from the Dump command.

```
HP 85 Basic Example: 10 CONTROL 7,16;129
                     20 OUTPUT 719;"FORCE="&A$
```

2.2 Mode Commands

Mode Commands must start will a minimum sequence of characters which match a legal command and end with a delimiter. See Parameter Entry for examples.

```
HP 85 Basic Example: 10 OUTPUT 719;"EXT"
```

2.3 Output Commands

Output Commands are inputed in the same format as Mode Commands (see above). However following an Output Command the instrument must be addressed as a Talker and the output message must be completely read by the controller.

2.3.1 Identify Command

The Identify command returns the ASCII message "INTEGRA SOURCE-1".

```
HP 85 Basic Example: 10 OUTPUT 719;"IDENT"
                     20 ENTER 719;A$

                (A$="INTEGRA SOURCE-1")
```

2.3.2 Dump Command

The Dump command will return a 57 byte binary message that represents the current set-up of the instrument. This message may be saved and reloaded into the Source-1 using the Force command.

```
HP 85 Basic Example: 10 CONTROL 7,16,2
                     20 OUTPUT 719;"DUMP"
                     30 ENTER 719 USING "#%,57A";A$
```

(A$= set-up message)

2.3.4 Trigger Sweep Command

The Trigger Sweep command (TRIG) is used to start a triggered sweep. After the sweep is completed the Source-1 will issue a Service Request (SRQ). At this time a Serial Poll should be executed to clear the SRQ and then a Retrace command to reset the sweep to the start frequency.

HP 85 Basic Example:

```
10 OUTPUT 719;"TRIG"
20 STATUS 7,2;S
30 IF BIT(S,5)<>1 THEN GOTO 20
40 S=SPOLL(719)
50 OUTPUT 719;"RETRACE"
60 STATUS 7,2;S
70 IF BIT(S,5)<>1 THEN GOTO 60
80 S=SPOLL(719)
```

2.3.5 Retrace Command

The Retrace command is used at the completion of a Triggered Sweep to reset the sweep to the start frequency. After the Retrace is complete the Source-1 will issue a Service Request (SRQ). At this time a Serial Poll should be executed to clear the SRQ.

HP 85 Basic Example:

```
50 OUTPUT 719;"RETRACE"
60 STATUS 7,2;S
70 IF BIT(S,5)<>1 THEN GOTO 60
80 S=SPOLL(719)
```

2.3.6 Abort Command

The Abort command is used to abort a Triggered Sweep and Retrace the sweep to the start frequency. After the Retrace is complete the Source-1 will issue a Service Request (SRQ). At this time a Serial Poll should be executed to clear the SRQ.

HP 85 Basic Example:

```
10 OUTPUT 719,"TRIGGER"
 .
 .
50 OUTPUT 719;"ABORT"
60 STATUS 7,2;S
70 IF BIT(S,5)<>1 THEN GOTO 60
80 S=SPOLL(719)
```

2.4 End of String Message (EOS)

The End of String Message or delimiter can be the ASCII characters Line Feed (LF), semicolon (;), comma (,), or the bus EOI line true with the last character.

2.5 Valid Characters

The alpha program codes may be upper or lower case ASCII. Spaces, leading zeros, and carriage returns (CR) are ignored. Also any unecessary characters following a valid command and before an equals sign or delimiter are ignored.

2.6 Bus Commands

The Source-1 will respond to the following bus commands.

2.6.1 Remote Mode

The instrument will enter the Remote mode when the bus REN line is asserted with the Source-1 bus address. The state of the instrument will be unchanged and all front panel controls except for the <CLEAR> button will be dissabled.

```
HP 85 Basic Example: 10 REMOTE 719
          or :       10 OUTPUT 719;"F1=2.000"
```

2.6.2 Local Mode

The instrument will return to the Local mode when the Go To Local (GTL) command is received or the <CLEAR> button is pushed. Note that the <CLEAR> button is disabled if the Local Lockout command has been received.

```
HP 85 Basic Example: 10 LOCAL 719
```

2.6.3 Local Lockout Mode

When the Local Lockout bus command (LLO) is recieved after a Remote command all front panel controls, including the <CLEAR> button are disabled. The only way to return to Local after this command is via the Go To Local command.

```
HP 85 Basic Example: 10 REMOTE 719
          (All controls except <CLEAR> disabled)
                     20 LOCAL LOCKOUT 7
          (All controls disabled)
                     30 LOCAL 719
          (Returns to Local)
```

2.6.4 Service Request

The Source-1 will generate a Service Request (SRQ) following a triggered sweep, sweep abort, or a sweep retrace command at the completion of the task. The SRQ is only cleared by executing a Serial Poll.

2.6.5 Serial Poll

The Source-1 responds to a Serial Poll with a status byte. The status byte will have Bit 1 true and if the instrument has

generated a Service Request (SRQ) Bit 6 will also be true.

```
HP 85 Basic Example: 10 OUTPUT 719;"TRIG"
                     20 STATUS 7,2;S
                     30 IF BIT(S,5)<>1 THEN GOTO 20
                     40 S=SPOLL(719)

                (S = 65 decimal)
```

2.6.6 Abort

The Source-1 responds to the Abort command (IFC) by reseting all commands in process and stopping all Listener or Talker functions.

```
HP 85 Basic Example:     10 ABORTIO 7
```

2.6.7 Clear

The Source-1 responds to the Clear command (DCL) by reseting all commands in process and stopping all Listener or Talker functions.

```
HP 85 Basic Example:     10 CLEAR 719
```

2.6.8 Bus Address

The Source-1 primary address default setting is 19. It can be changed between 0 and 30 through the Select GPIB Mode using front panel controls.

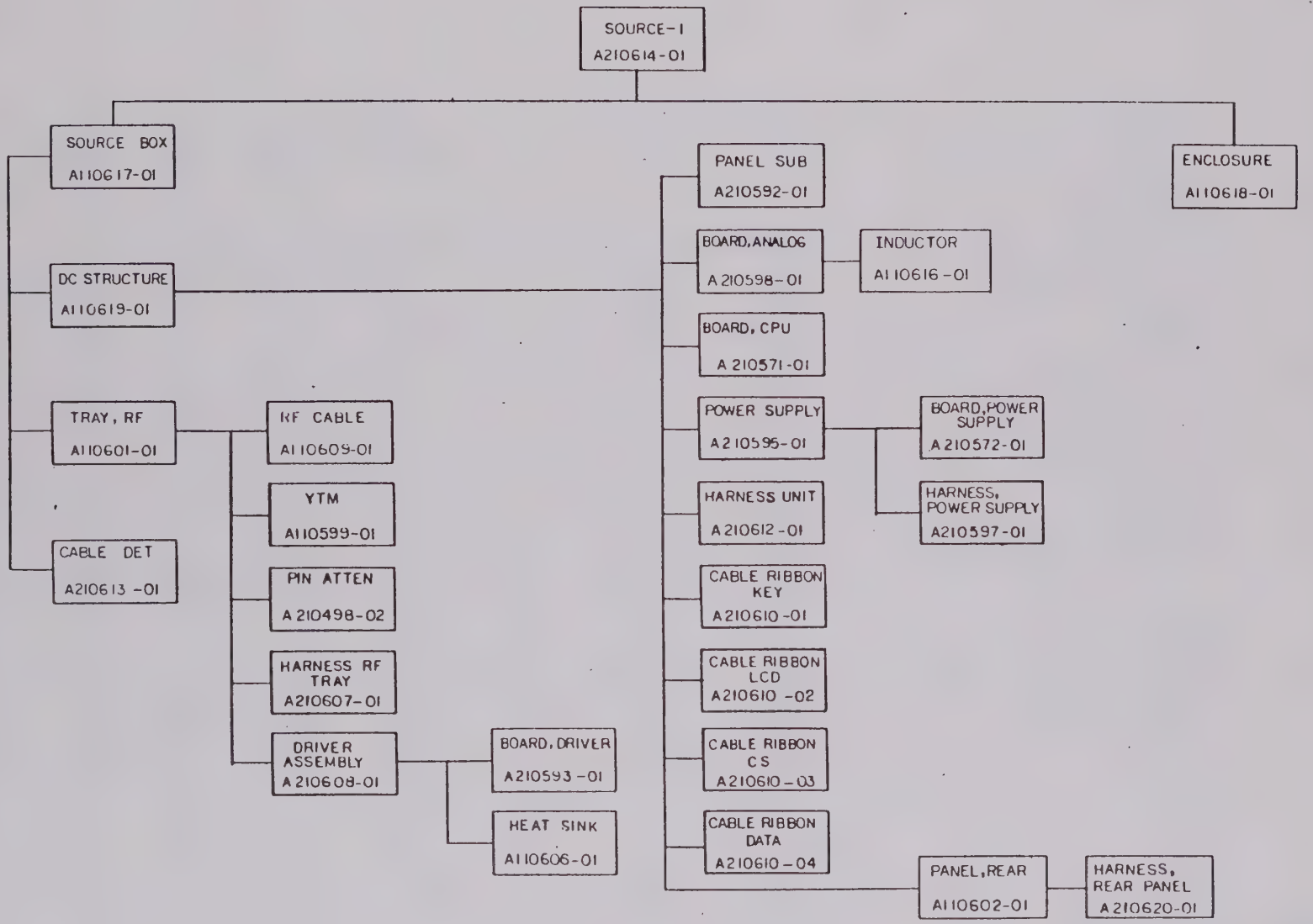
2.7 Command Table

COMMAND FUNCTION	COMMAND FORMAT(S)	NUMERIC RANGE	HP 85 BASIC PROGRAMING EXAMPLE(S)
Start Freq	F1 2	10	OUTPUT 719;"F1=2"
	STA 19.999	10	OUTPUT 719;"START=19.999"
Stop Freq	F2 2.001	10	OUTPUT 719;"F2=2.001"
	STOP 20	10	OUTPUT 719;"STOP=20"
Manual Freq	F0 F1	10	OUTPUT 719;"F0=10.987"
	MAN F2	10	OUTPUT 719;"MANUAL=11"
CW Freq	CW 2	10	OUTPUT 719;"CW=2"
	20	10	OUTPUT 719;"CW=20"
Sweep Time	SW .020	10	OUTPUT 719;"SW=.020"
(Internal)	TI 120	10	OUTPUT 719;"TIME=120"
Output Power	PO -15	10	OUTPUT 719;"PO=-15"
	20	10	OUTPUT 719;"POWER=20"
Breakpoint	B 4	10	OUTPUT 719;"B=4"
Frequency	FB 10	10	OUTPUT 719;"FB=20"

Center Freq	CF	2	10 OUTPUT 719;"CF=2"
	CE	20	10 OUTPUT 719;"CENTER=20"
Delta Freq	DF	.002	10 OUTPUT 719;"DF=.002"
	DE	18	10 OUTPUT 719;"DELTA=18"
RF Marker 1	M1	2	10 OUTPUT 719;"M1=2"
	MARKER1	20	10 OUTPUT 719;"MARKER1=20"
RF Marker 2	M2	2	10 OUTPUT 719;"M2=2"
	MARKER2	20	10 OUTPUT 719;"MARKER2=20"
RF Marker 3	M3	2	10 OUTPUT 719;"M3=2"
	MARKER3	20	10 OUTPUT 719;"MARKER3=20"
RF Marker 4	M4	2	10 OUTPUT 719;"M4=2"
	MARKER4	20	10 OUTPUT 719;"MARKER4=20"
External Sweep Mode	EXT		10 OUTPUT 719;"EXT"
CW Filter Cap.	CA	ON	10 OUTPUT 719;"CAP=ON"
	FLT	OFF	10 OUTPUT 719;"FLTR=OFF"
	FILT		10 OUTPUT 719;"FILTER=ON"
Triggered Sweep Time	TSP	.020	10 OUTPUT 719;"TSP=.02"
		120	10 OUTPUT 719;"TSP=120"
Store Set-up	STOR	0	10 OUTPUT 719;"STOR=0"
		9	10 OUTPUT 719;"STORE=9"
Recall Set-up	REC	0	10 OUTPUT 719;"REC=0"
		9	10 OUTPUT 719;"RECALL=9"
Dump Set-up	DUMP		10 CONTROL 7,16,2 20 OUTPUT 719;"DUMP" 30 ENTER 719 USING "#%,57A";A$
Force Set-up	FORCE		10 CONTROL 7,16;129 20 OUTPUT 719;"FORCE="&A$
Print on Display	PR		10 OUTPUT 719;"PR=TEST" 10 OUTPUT 719;"PRINT=TEST"
Secure Display	SE		10 OUTPUT 719;"SE" 10 OUTPUT 719;"SECURE"
Unsecure Display	UNSEC	Pass-word	10 OUTPUT 719;"UNSEC=1234" 10 OUTPUT 719;"UNSECURE=1234"
Password	PASS	0000	10 OUTPUT 719;"PASS=0000"
		9999	10 OUTPUT 719;"PASSWORD=9999"

Trigger Sweep	TRIG	10 OUTPUT 719;"TRIGGER" 20 STATUS 7,2;S 30 IF BIT(S,5)<>1 THEN GOTO 20 40 S=SPOLL(719)
Retrace Sweep	RETR	50 OUTPUT 719;"RETRACE" 60 STATUS 7,2;S 70 IF BIT(S,5)<>1 THEN GOTO 60 80 S=SPOLL(719)
Abort Trig. Sweep	ABORT	50 OUTPUT 719;"TRIGGER" 60 OUTPUT 719;"ABORT" 70 STATUS 7,2;S 80 IF BIT(S,5)<>1 THEN GOTO 70 90 S=SPOLL(719)
.5V/GHz Ext. Sweep Mode	.5V	10 OUTPUT 719;".5V" 10 OUTPUT 719;".5V/GHZ EXTERNAL"
Clear Memory	CLEAR	10 OUTPUT 719;"CLEAR"
Identify Unit	IDENT	10 OUTPUT 719;"IDENT" 10 ENTER 719;A$ (A$ = "INTEGRA SOURCE-1")
Set-up	FORCE	10 CONTROL 7,16;129 20 OUTPUT 719;"FORCE="&A$
Print on	PR	10 OUTPUT 719

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
ALL	C	UPDATE	4-1-87	



QTY REQD	FSCM NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES .X ±.1 .XX ±.01 .XXX ±.005

CONTRACT NO

APPROVALS	DATE
DRAWN JAN	3-16-7
CHECKED	
ISSUED	

MATERIAL

FINISH

DO NOT SCALE DRAWING

	SOURCE-1
NEXT ASSY	USED ON

APPLICATION

INTEGRA MICROWAVE

PRODUCT TREE

SIZE	FSCM NO	DWG NO	REV
C	51162	B710614-01	D

SCALE

SHEET 1

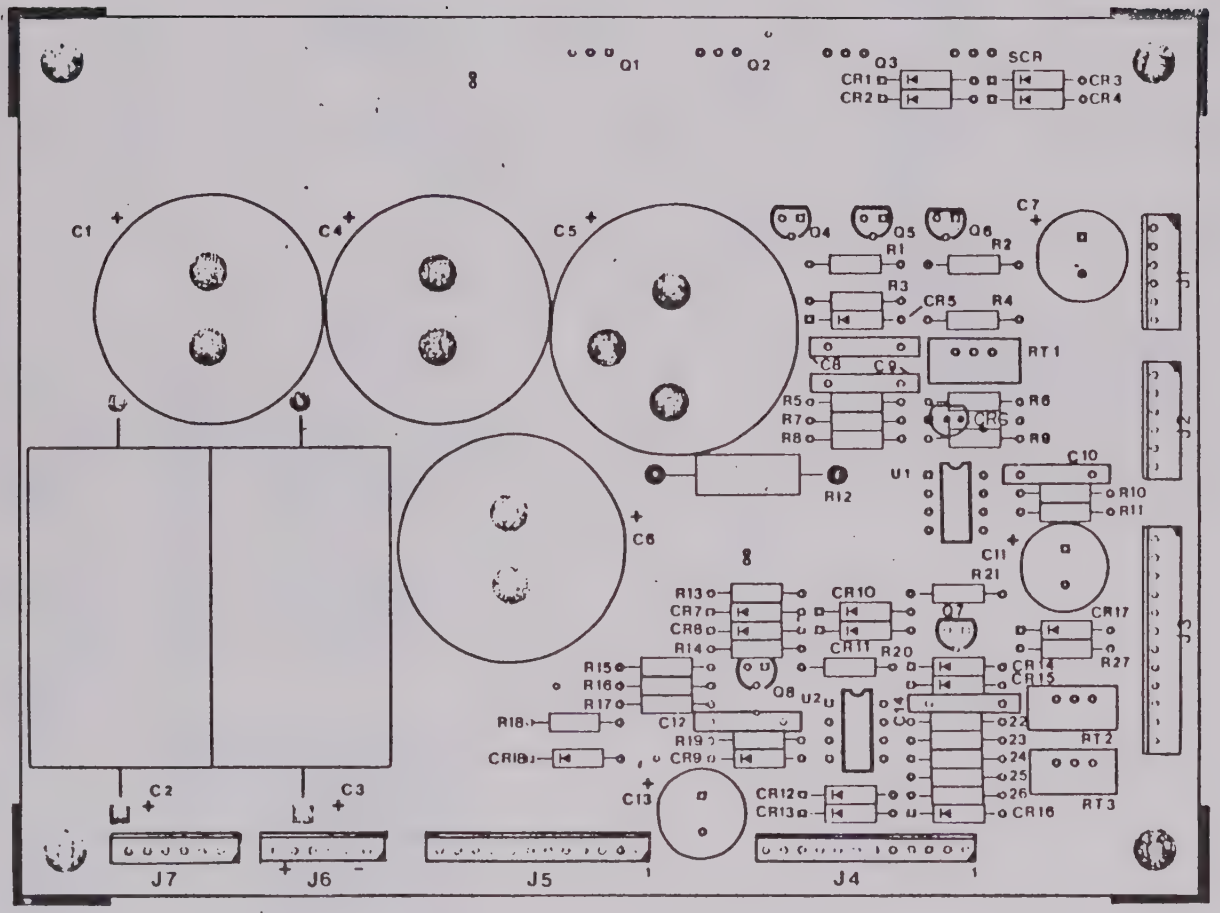
© BISHOP GRAPHICS INC REORDER NO. 20511

SENT BY:STAR MICROWAVE ; 9-25-89 ; 9:29AM ; 4083746247→ 415 964 8673;# 2

SOURCE-1 SPECIFICATIONS

Sweep Generator Model	S-0220	S-0210	S-0618	S-0812	S-0818	S-0820	S-1826	S-2640
Frequency Characteristics								
Range:	2-20 GHz	2-10 GHz	6-18 GHz	8-12 GHz	8-18 GHz	8-20 GHz	18-26 GHz	26-40 GHz
Accuracy (25°C)								
CW Mode	±10 MHz 2-10 GHz ±20 MHz 10-20 GHz	±10 MHz	±10 MHz	±10 MHz	±10 MHz	±10 MHz	±20 MHz	±30 MHz
Sweep Mode	±30 MHz	±15 MHz	±15 MHz	±15 MHz	±15 MHz	±15 MHz	±30 MHz	±40 MHz
Resolution	1 MHz	1 MHz	1 MHz	1 MHz	1 MHz	1 MHz	1 MHz	1 MHz
Stability:								
With Temperature	±1 MHz/°C	±1 MHz/°C	±1 MHz/°C	±1 MHz/°C	±1 MHz/°C	±1 MHz/°C	±1 MHz/°C	±1 MHz/°C
With 10% Line Voltage Change	±100 kHz	±100 kHz	±100 kHz	±100 kHz	±100 kHz	±100 kHz	±100 kHz	±100 kHz
With 10 dB Power Level Change	±500 kHz	±500 kHz	±500 kHz	±500 kHz	±500 kHz	±500 kHz	±500 kHz	±500 kHz
With 3:1 Load SWR	±250 kHz	±250 kHz	±250 kHz	±250 kHz	±250 kHz	±250 kHz	±250 kHz	±250 kHz
With Time, 30 minute (typical)[1]	±200 kHz	±200 kHz	±200 kHz	±200 kHz	±200 kHz	±200 kHz	±200 kHz	±200 kHz
Residual FM (30 Hz - 15 kHz Bandwidth), CW Mode	<20 kHz pk	<10 kHz pk	<10 kHz pk	<10 kHz pk	<10 kHz pk	<10 kHz pk	<20 kHz pk	<40 kHz pk
Output Characteristics								
Maximum Leveled Power (25°C ±5°)	1 mW (0 dBm)	20 mW (+13 dBm)	10 mW (+10 dBm)	20 mW (+13 dBm)	20 mW (+13 dBm)	2 mW (+3 dBm)	2 mW (+3 dBm)	10 mW (+10 dBm)
With Option 2, 70 dB Attenuator	2 dB Loss	1 dB Loss	2 dB Loss	2 dB Loss	2 dB Loss	2 dB Loss	—	—
Power Level Accuracy (Internally Leveled Flatness)	±1 dB	±1 dB	±1 dB	±1 dB	±1 dB	±1 dB	±2 dB	±2 dB
With Option 2, 70 dB Attenuator	±1.5 dB	±1.5 dB	±1.5 dB	±1.5 dB	±1.5 dB	±1.5 dB	±3 dB	±3 dB
Calibrated Power Range	11 dB	11 dB	11 dB	11 dB	11 dB	11 dB	11 dB	11 dB
With Option 2, 70 dB Attenuator	81 dB	81 dB	81 dB	81 dB	81 dB	81 dB	81 dB	81 dB
Attenuator Accuracy (Per Step)	±0.3 dB	±0.4 dB	±0.4 dB	±0.4 dB	±0.4 dB	±0.4 dB	±0.5 dB	±0.5 dB
Power Variation:								
With Frequency (Internally Leveled)	±0.6 dB	±0.6 dB	±0.6 dB	±0.6 dB	±0.6 dB	±0.6 dB	±0.6 dB	±0.6 dB
With Frequency and Option 2, 70 dB Attenuator	±1.5 dB	±1.5 dB	±1.5 dB	±1.5 dB	±1.5 dB	±1.5 dB	±1.5 dB	1.5 dB
Spectral Purity:								
Harmonics	−55 dBc	−55 dBc	−55 dBc	−55 dBc	−55 dBc	−55 dBc	−40 dBc	−20 dBc
Non-Harmonics	−60 dBc	−60 dBc	−60 dBc	−60 dBc	−60 dBc	−60 dBc	−60 dBc	−60 dBc
Source SWR (50Ω)	<1.4	<1.4	<1.4	<1.4	<1.4	<1.4	<1.7	<1.7
With Option 2, 70 dB Attenuator	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.2	<2.2
Residual AM (50 kHz Bandwidth at Rated Power)	−50 dBc	−50 dBc	−50 dBc	−50 dBc	−50 dBc	−50 dBc	−50 dBc	−50 dBc
Output Connector Type	Type N Female	Type N Female	Type N Female	Type N Female	Type N Female	Type N Female	3.5 mm	Waveguide
Modulation Characteristics								
External FM and Phaselock:								
Sensitivity	−6 MHz/V	−6 MHz/V	−6 MHz/V	−6 MHz/V	−6 MHz/V	−6 MHz/V	−6 MHz/V	−6 MHz/V
Maximum Deviation for Modulation Frequency of:								
DC — 500 kHz	±75 MHz	±75 MHz	±75 MHz	±75 MHz	±75 MHz	±75 MHz	±75 MHz	±75 MHz
100 — 250 kHz	±5 MHz	±5 MHz	±5 MHz	±5 MHz	±5 MHz	±5 MHz	±5 MHz	±5 MHz

[1] After 30 minutes warm-up at CW frequency.



QTY REQD	FSCM NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION		MATERIAL SPECIFICATION

PARTS LIST

	SOURCE-1		
NEXT ASSY	USED ON		
APPLICATION		DO NOT SCALE DRAWING	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS DECIMALS ANGLES
.X ±.1
.XX ±.01

MATERIAL SEE PART LIST
FINISH

CONTRACT NO

APPROVALS	DATE
DRAWN W.m.C.	2-4-87
CHECKED	
ISSUED	3-3-87

INTEGRA

POWER SUPPLY BD.

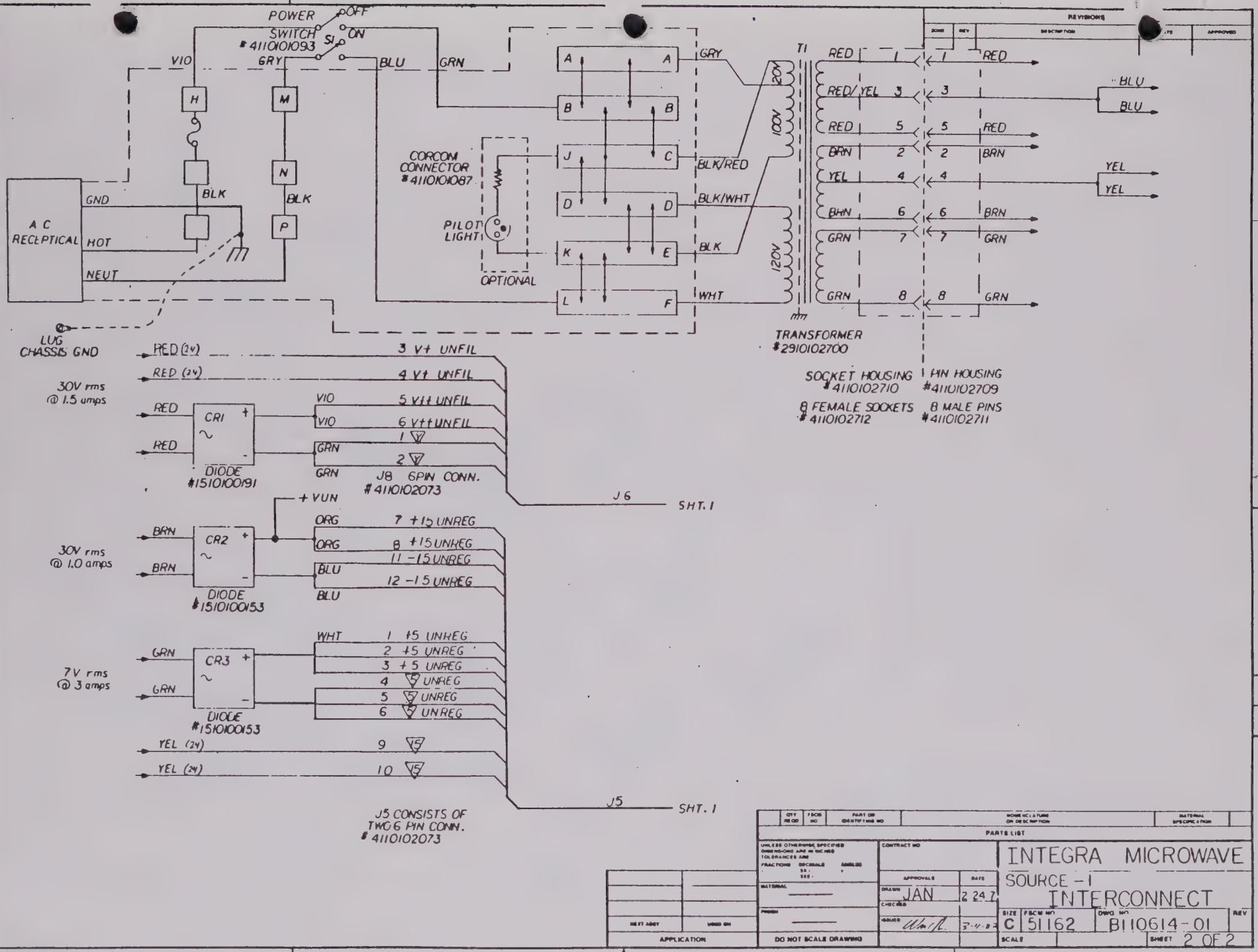
SIZE	FSCM NO	DWG NO	REV
C	51162	8210572-01	A

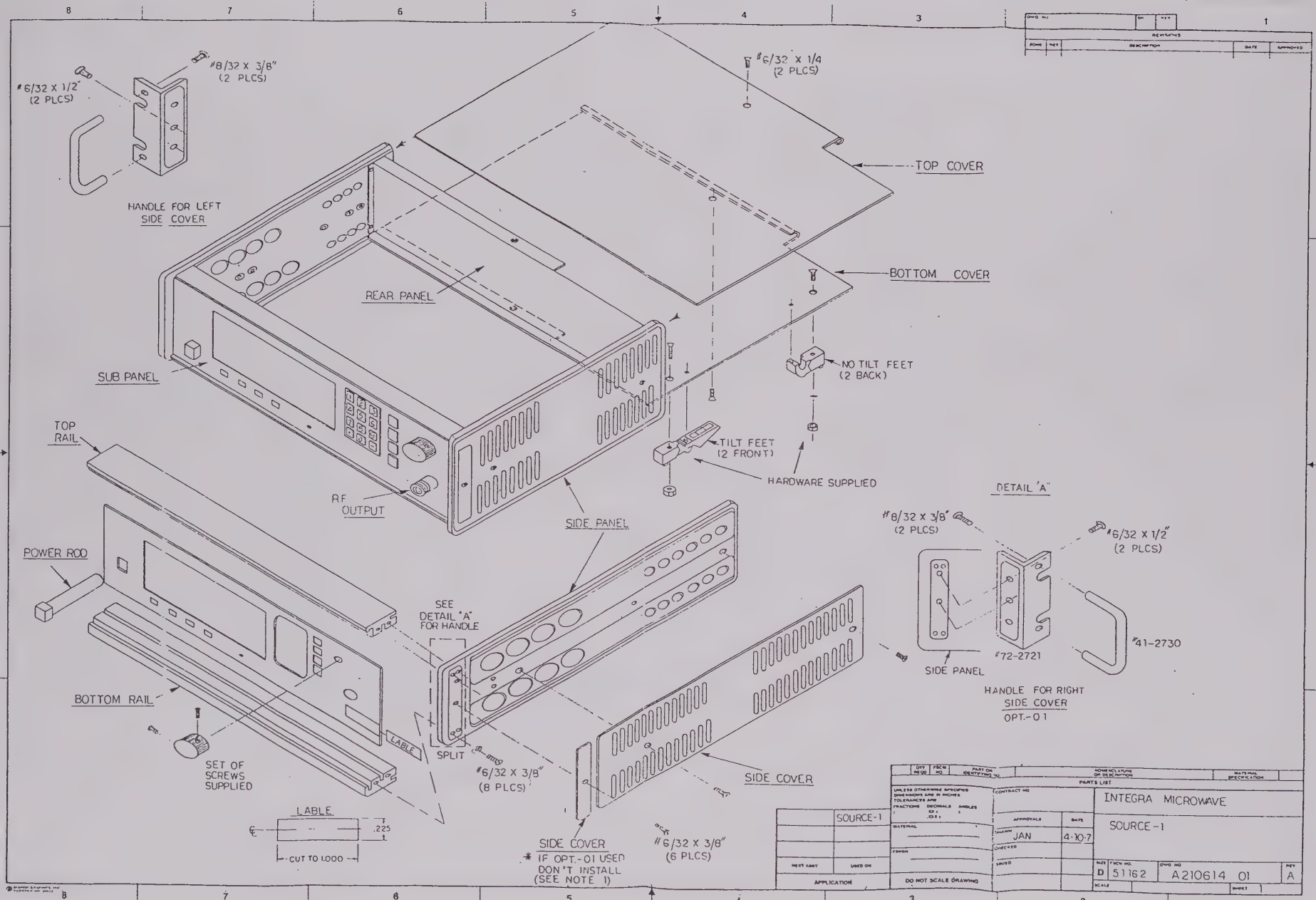
SCALE —— SHEET ——

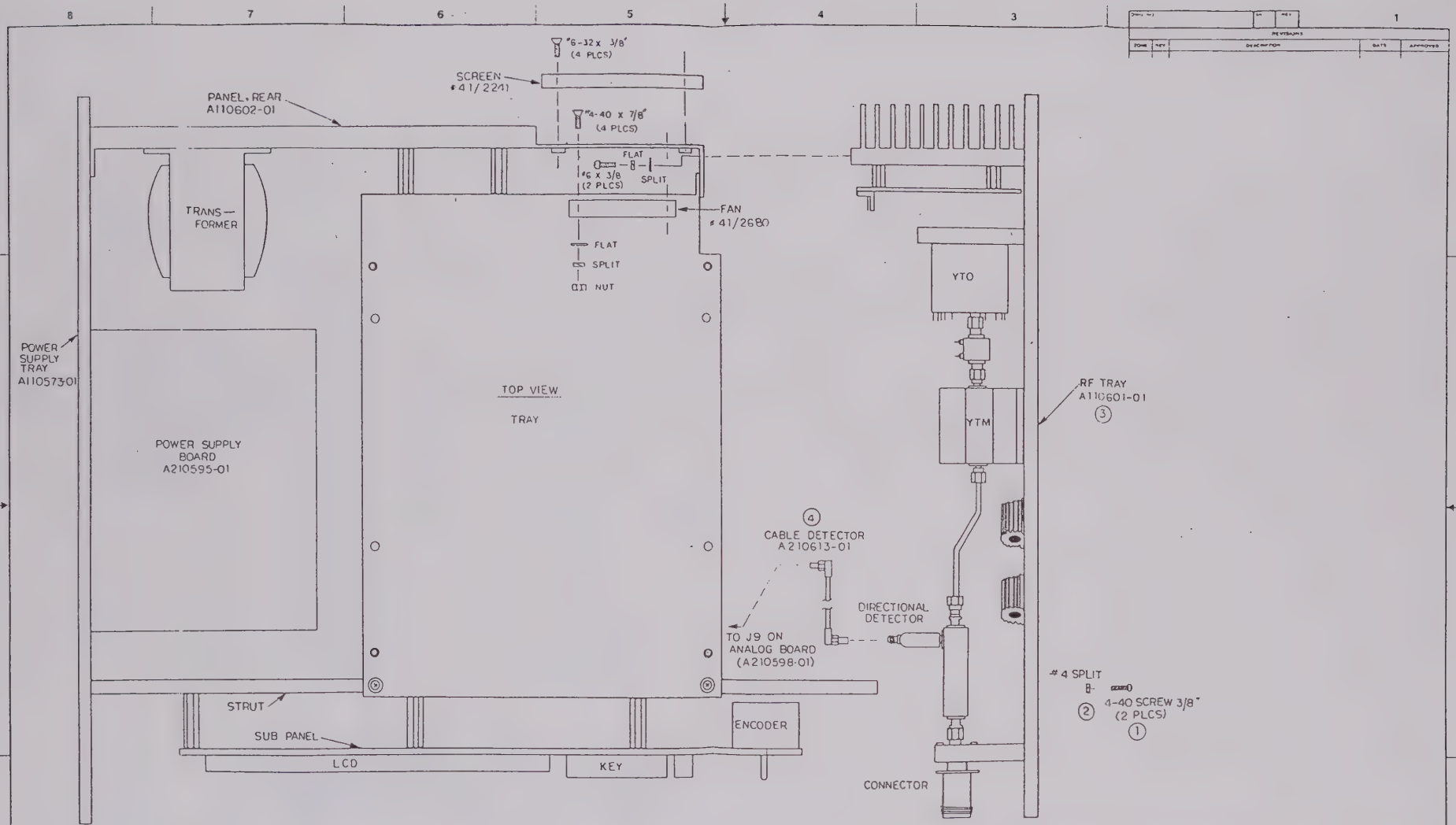
BISHOP GRAPHICS INC
REORDER NO 70511

4 3 2 1

D C A


POWER SWITCH #4110101093
OFF
ON
S1
VIO
GRY
BLU
GRN
H
M
N
P
BLK
BLK
A C RECEPTICAL
GND
HOT
NEUT
LUG CHASSIS GND
CORCOM CONNECTOR #4110101087
PILOT LIGHT
OPTIONAL
A
B
C
D
E
F
J
K
L
GRY
BLK/RED
BLK/WHT
BLK
WHT
T1
120V
120V
RED 1
RED/YEL 3
RED 5
BRN 2
YEL 4
BRN 6
GRN 7
GRN 8
RED
BLU
BLU
RED
BRN
YEL
YEL
BRN
GRN
GRN
TRANSFORMER #2910102700
SOCKET HOUSING #4110102710
8 FEMALE SOCKETS #4110102712
PIN HOUSING #4110102709
8 MALE PINS #4110102711
RED (24)
RED (24)
3 V+ UNFIL
4 V+ UNFIL
30V rms @ 1.5 amps
RED
RED
CR1
DIODE #1510100191
VIO
VIO
GRN
GRN
5 V++ UNFIL
6 V++ UNFIL
1
2
J8 6PIN CONN. #4110102073
J6
SHT. 1
+VUN
BRN
BRN
CR2
DIODE #1510100153
30V rms @ 1.0 amps
ORG
ORG
BLU
BLU
7 +15 UNREG
8 +15 UNREG
11 -15 UNREG
12 -15 UNREG
GRN
GRN
CR3
DIODE #1510100153
7V rms @ 3 amps
WHT
1 +5 UNREG
2 +5 UNREG
3 +5 UNREG
4 +5 UNREG
5 +5 UNREG
6 +5 UNREG
YEL (24)
YEL (24)
9 +5
10 +5
J5
SHT. 1
J5 CONSISTS OF TWO 6 PIN CONN. #4110102073
REVISIONS
PARTS LIST
INTEGRA MICROWAVE
SOURCE - 1
INTERCONNECT
JAN 2 24 1
3-4-87
C 51162
B110614-01
SHEET 2 OF 2
APPLICATION
DO NOT SCALE DRAWING
4
3
2
1


#6/32 X 1/2" (2 PLCS)
#8/32 X 3/8" (2 PLCS)
HANDLE FOR LEFT SIDE COVER
#6/32 X 1/4 (2 PLCS)
TOP COVER
BOTTOM COVER
REAR PANEL
SUB PANEL
NO TILT FEET (2 BACK)
TILT FEET (2 FRONT)
HARDWARE SUPPLIED
TOP RAIL
RF OUTPUT
SIDE PANEL
POWER ROD
SEE DETAIL "A" FOR HANDLE
BOTTOM RAIL
LABLE
SPLIT
#6/32 X 3/8" (8 PLCS)
SET OF SCREWS SUPPLIED
SIDE COVER
* IF OPT.-01 USED DON'T INSTALL (SEE NOTE 1)
#6/32 X 3/8" (6 PLCS)
LABLE
.225
CUT TO 1.000
DETAIL "A"
#8/32 X 3/8" (2 PLCS)
#6/32 X 1/2" (2 PLCS)
#72-2721
#41-2730
SIDE PANEL
HANDLE FOR RIGHT SIDE COVER OPT.-01
SOURCE-1
INTEGRA MICROWAVE
SOURCE-1
JAN 4-10-7
D 51162
A210614 01
A

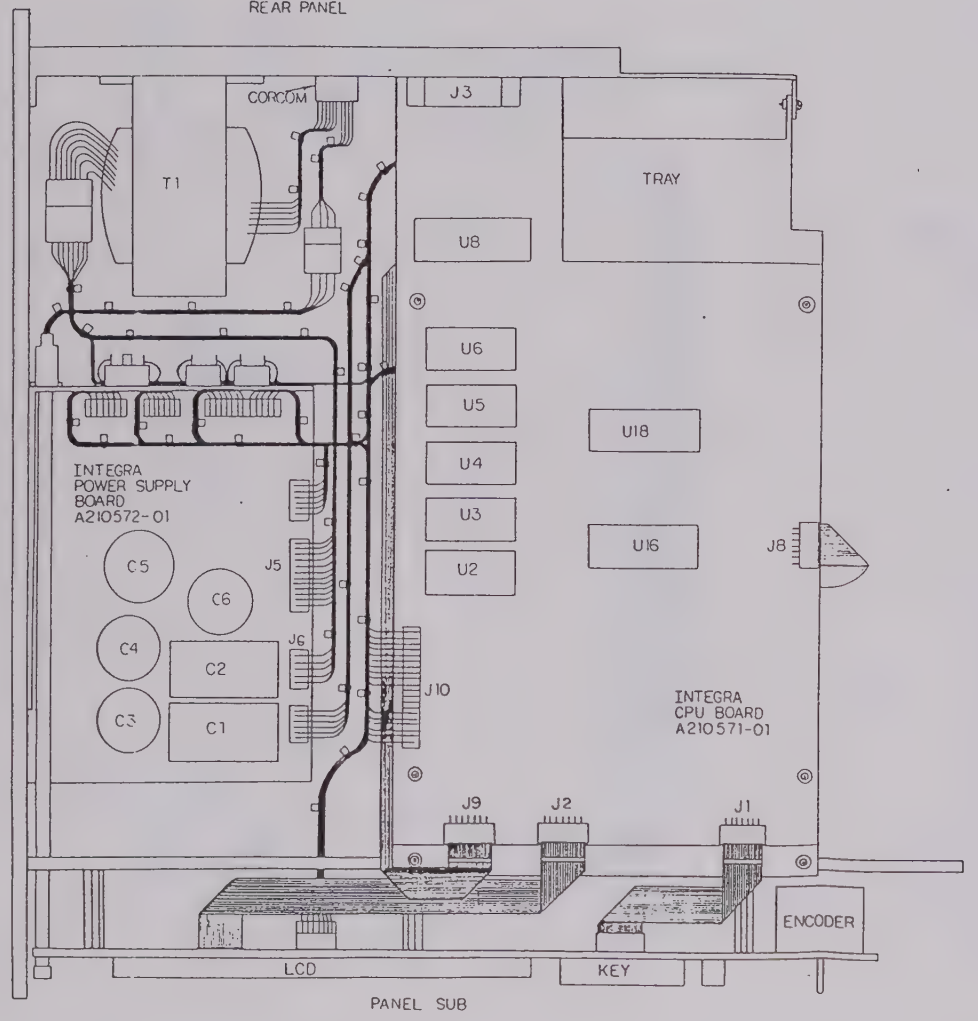


DC STRUCTURE

(8)

	SOURCE-1			INTEGRA MICROWAVE	
			JAN	4-17-7	SOURCE BOX, ASSY.
				SIZE D	FSCM NO. 51162
				DWG. NO. A110617-01	REV A
				SCALE	SHEET 1
		APPLICATION	DO NOT SCALE DRAWING		

ZONE	REV	DESCRIPTION	DATE	APPROVED
D-5	C	TOOK FAN & COVER OFF THIS DWG	4-5-7	



TOP VIEW

	SOURCE-1				
NEXT ASSY	USED ON				
APPLICATION		DO NOT SCALE DRAWING			

QTY REQD	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION
PARTS LIST				

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS DECIMALS ANGLES
.XX ±
.XXX ±

CONTRACT NO

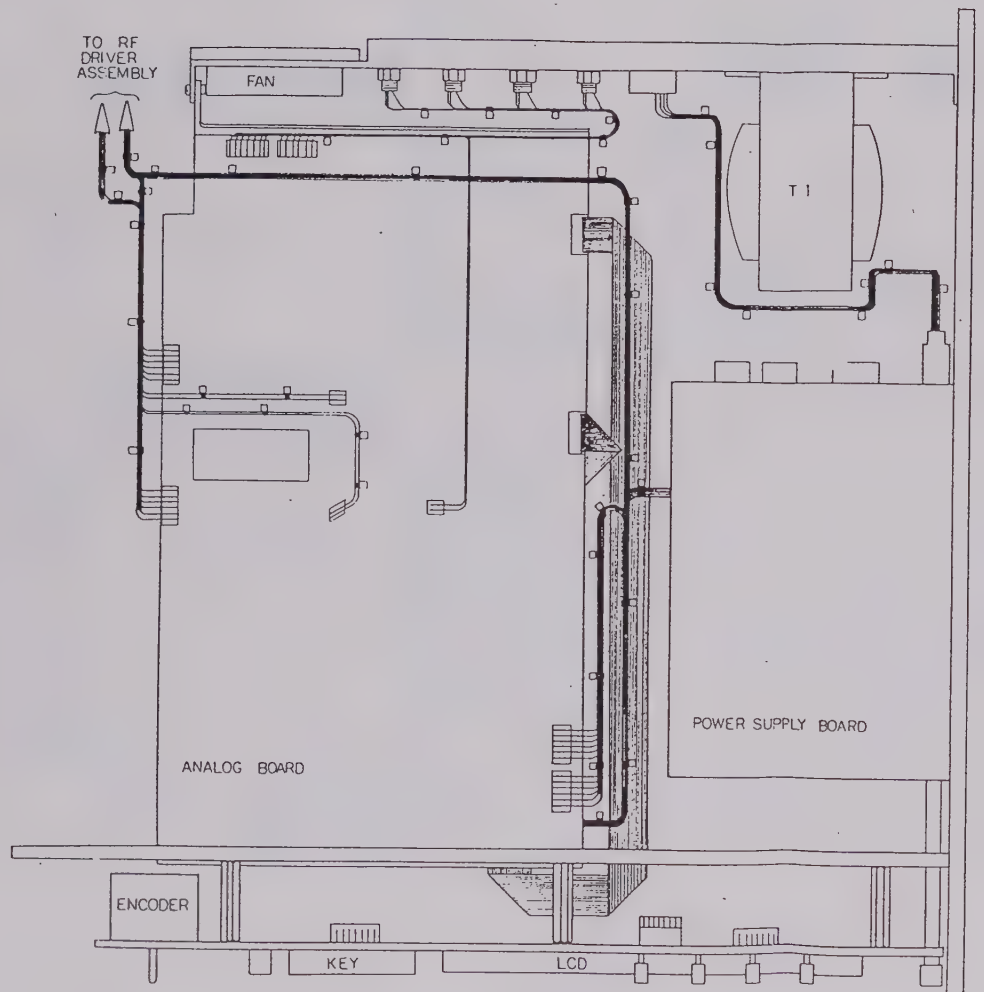
APPROVALS	DATE
DRAWN JAN	3-20-7
CHECKED	
TOL CHK	

INTEGRA MICROWAVE

DC STRUCTURE
CPU INSTALLED, HARNESS & RIBBON CABLE LOCATION

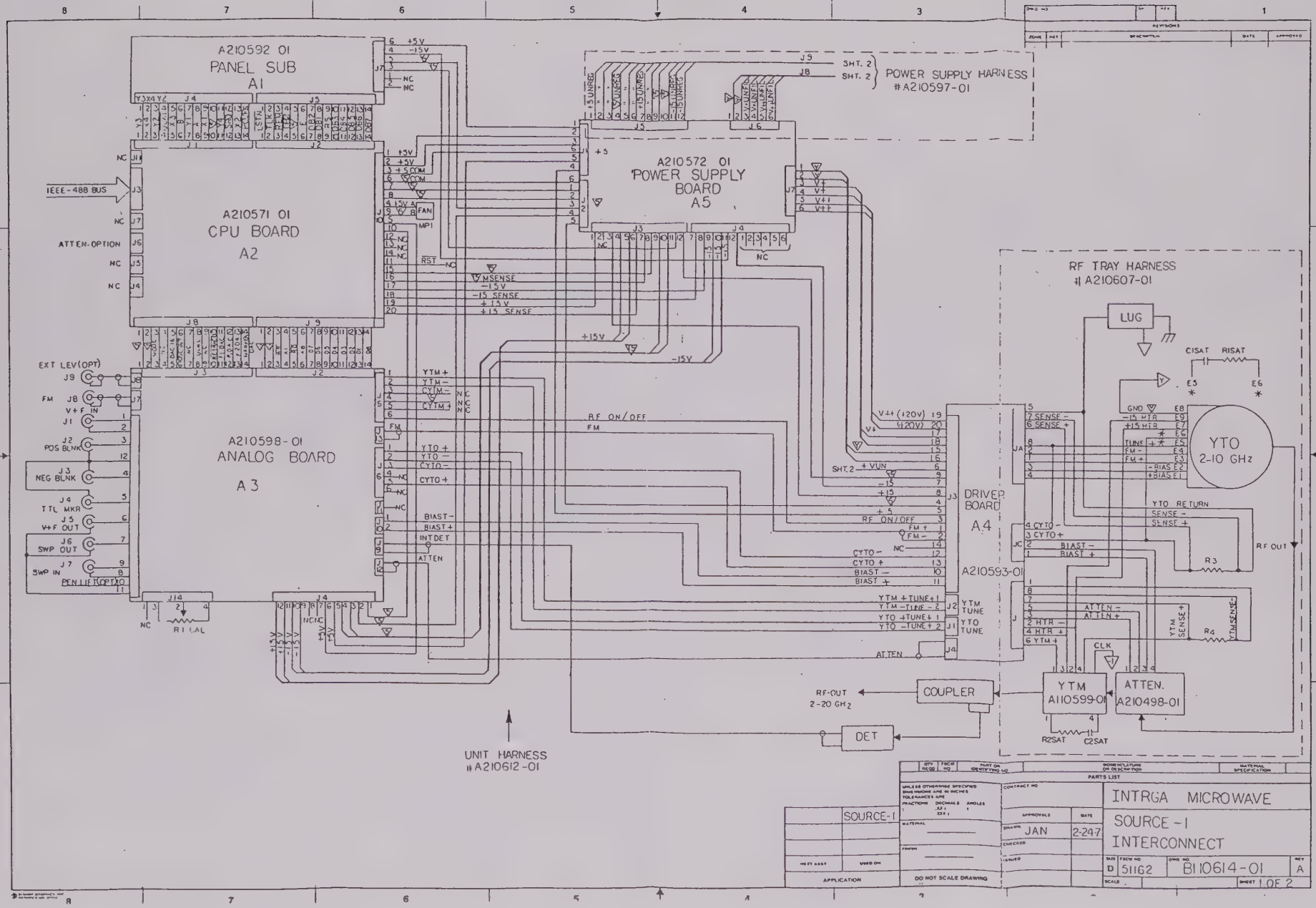
SIZE	F SCM NO	DWG NO	REV
D	51162	B210619-01	C

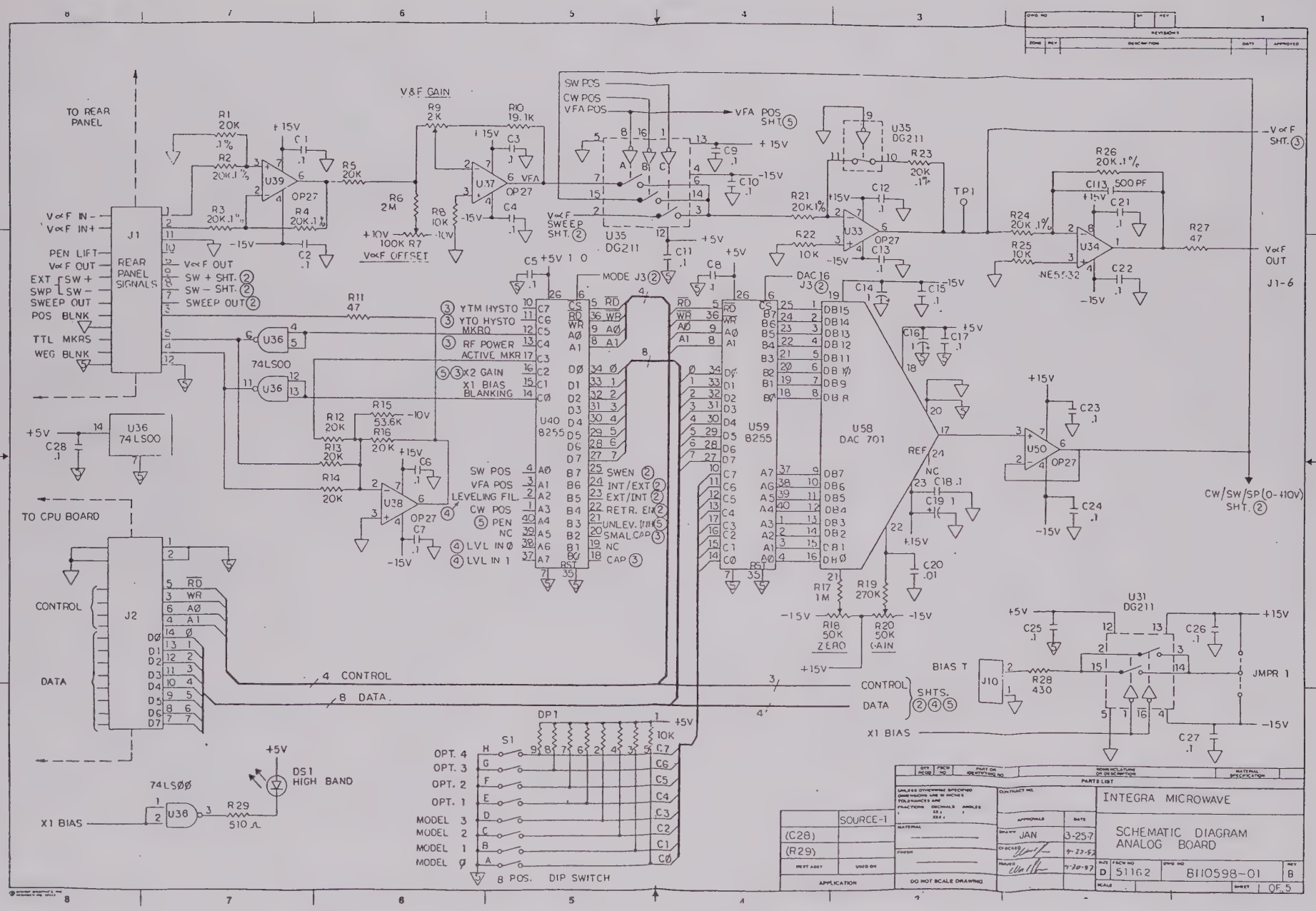
SCALE 1/1 SHEET 3 OF 4

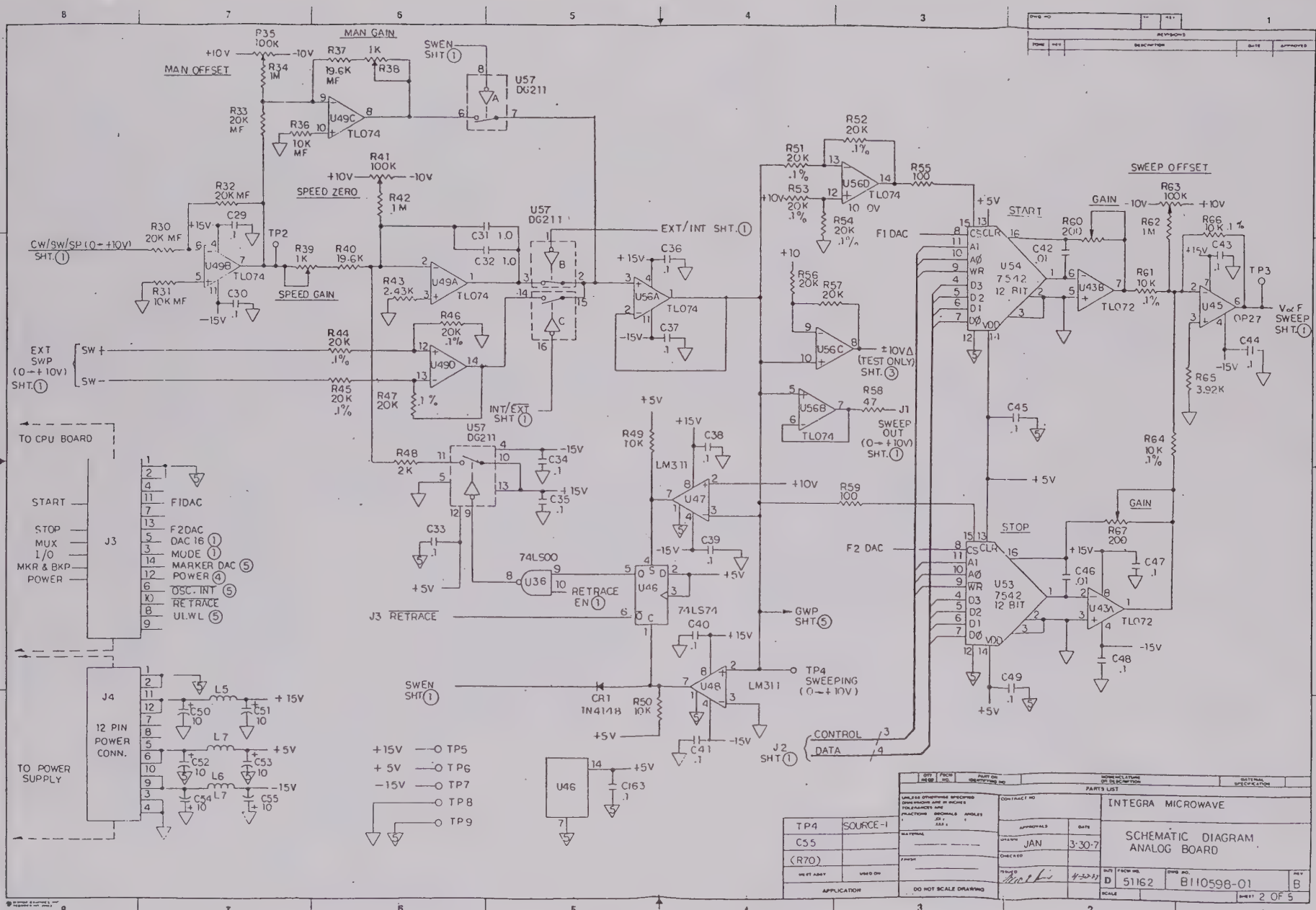


BOTTOM VIEW

SOURCE-1	
APPLICATION	DO NOT SCALE DRAWING
DRAWN	JAN 3-23-7
	INTEGRA MICROWAVE
	DC STRUCTURE
SIZE D	DWG NO 51162
SCALE 1/1	SHEET 4 OF 4


A210592 01
PANEL SUB
A1
A210571 01
CPU BOARD
A2
A210598-01
ANALOG BOARD
A3
A210572 01
POWER SUPPLY
BOARD
A5
POWER SUPPLY HARNESS
#A210597-01
RF TRAY HARNESS
#A210607-01
DRIVER
BOARD
A4
A210593-01
IEEE-488 BUS
EXT LEV(OPT)
FM
V+F IN
POS BLNK
NEG BLNK
TTL MKR
V+F OUT
SWP OUT
SWP IN
PEN LIFT(OPT)
ATTEN-OPTION
FAN
MP1
RST
MSENSE
-15V
-15 SENSE
+15 SENSE
+15V
-15V
RF ON/OFF
FM
YTM+
YTM-
CYTM-
CYTM+
YTO+
YTO-
CYTO+
CYTO-
BIAST-
BIAST+
INTDET
ATTEN
R1 CAL
LUG
CISAT
RISAT
E5
E6
YTO
2-10 GHz
YTO RETURN
SENSE-
SENSE+
RF OUT
R3
R4
YTM TUNE
YTO TUNE
CLK
YTM
A110599-01
ATTEN.
A210498-01
R2SAT
C2SAT
COUPLER
RF-OUT
2-20 GHz
DET
UNIT HARNESS
#A210612-01
SOURCE-1
INTRGA MICROWAVE
SOURCE-1
INTERCONNECT
PARTS LIST
DO NOT SCALE DRAWING
JAN 2-24-7
D 51162
B10614-01
A
1 OF 2


TO REAR PANEL
J1
REAR PANEL SIGNALS
V&F IN -
V&F IN +
PEN LIFT
V&F OUT
EXT SW +
SWP SW -
SWEEP OUT
POS BLNK
TTL MKRS
WEG BLNK
V&F OUT
SW + SHT. (2)
SW - SHT. (2)
SWEEP OUT (2)
V&F GAIN
R1 20K .1%
R2 20K .1%
R3 20K .1%
R4 20K .1%
R5 20K
R6 2M
R8 10K
R9 2K
R10 19.1K
R11 47
R12 20K
R13 20K
R14 20K
R15 53.6K
R16 20K
R17 1M
R18 50K ZERO
R19 270K
R20 50K GAIN
R21 20K 1%
R22 10K
R23 20K .1%
R24 20K .1%
R25 10K
R26 20K .1%
R27 47
R28 430
R29 510Ω
+15V
-15V
+10V
-10V
V&F OFFSET
U35 DG211
U36 74LS00
U37 OP27
U38 OP27
U39 OP27
U33 OP27
U34 NE5532
U50 OP27
U40 8255
U59 8255
U58 DAC 701
SW POS
CW POS
VFA POS
VFA POS SHT. (5)
V&F SWEEP SHT. (2)
V&F SHT. (3)
MODE J3 (2)
DAC 16 J3 (2)
YTM HYSTO (3)
YTO HYSTO MKRQ (3)
RF POWER ACTIVE MKR (3)
X2 GAIN (5)(3)
X1 BIAS
BLANKING
SWEN (2)
INT/EXT (2)
EXT/INT (2)
RETR. EN (2)
UNLEV. (5)
SMALCAP (3)
NC
CAP (3)
SW POS
VFA POS
LEVELING FIL.
CW POS (5)
PEN
NC
LVL IN Ø (4)
LVL IN 1 (4)
TP1
CW/SW/SP (0-+10V) SHT. (2)
J1-6
TO CPU BOARD
J2
CONTROL
DATA
4 CONTROL
8 DATA
4'
3'
CONTROL
DATA
SHTS. (2)(4)(5)
X1 BIAS
BIAS T
J10
JMPR 1
DP1
S1
10K
OPT. 4
OPT. 3
OPT. 2
OPT. 1
MODEL 3
MODEL 2
MODEL 1
MODEL Ø
8 POS. DIP SWITCH
DS1 HIGH BAND
74LSØØ
U38
X1 BIAS
PARTS LIST
SOURCE-1
(C28)
(R29)
INTEGRA MICROWAVE
SCHEMATIC DIAGRAM
ANALOG BOARD
D 51162
B110598-01
B
SHEET 1 OF 5
DO NOT SCALE DRAWING
JAN 3-25-7
4-22-92
7-20-92



TP4	SOURCE-1
C55	
(R70)	

PARTS LIST

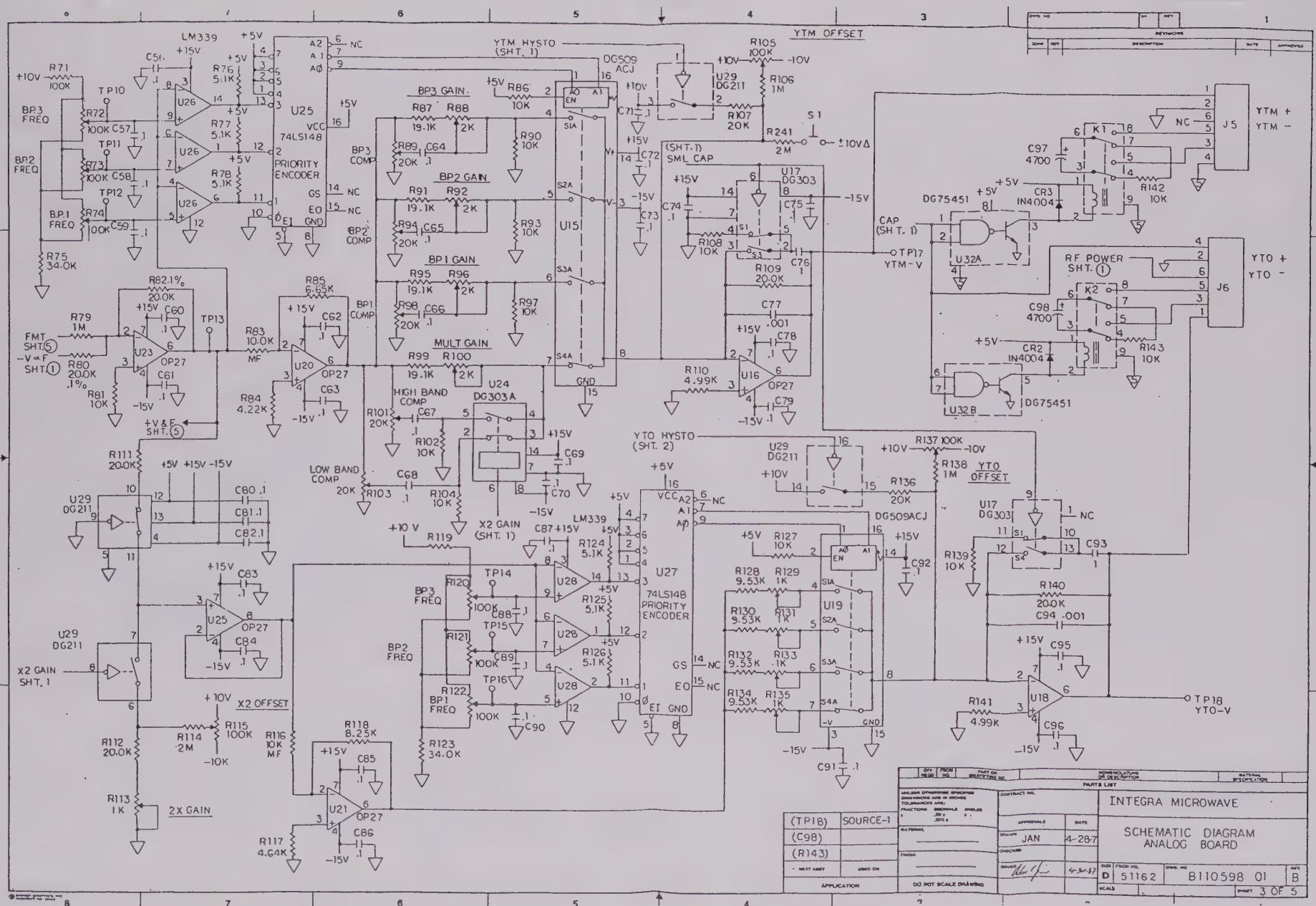
DO NOT SCALE DRAWING

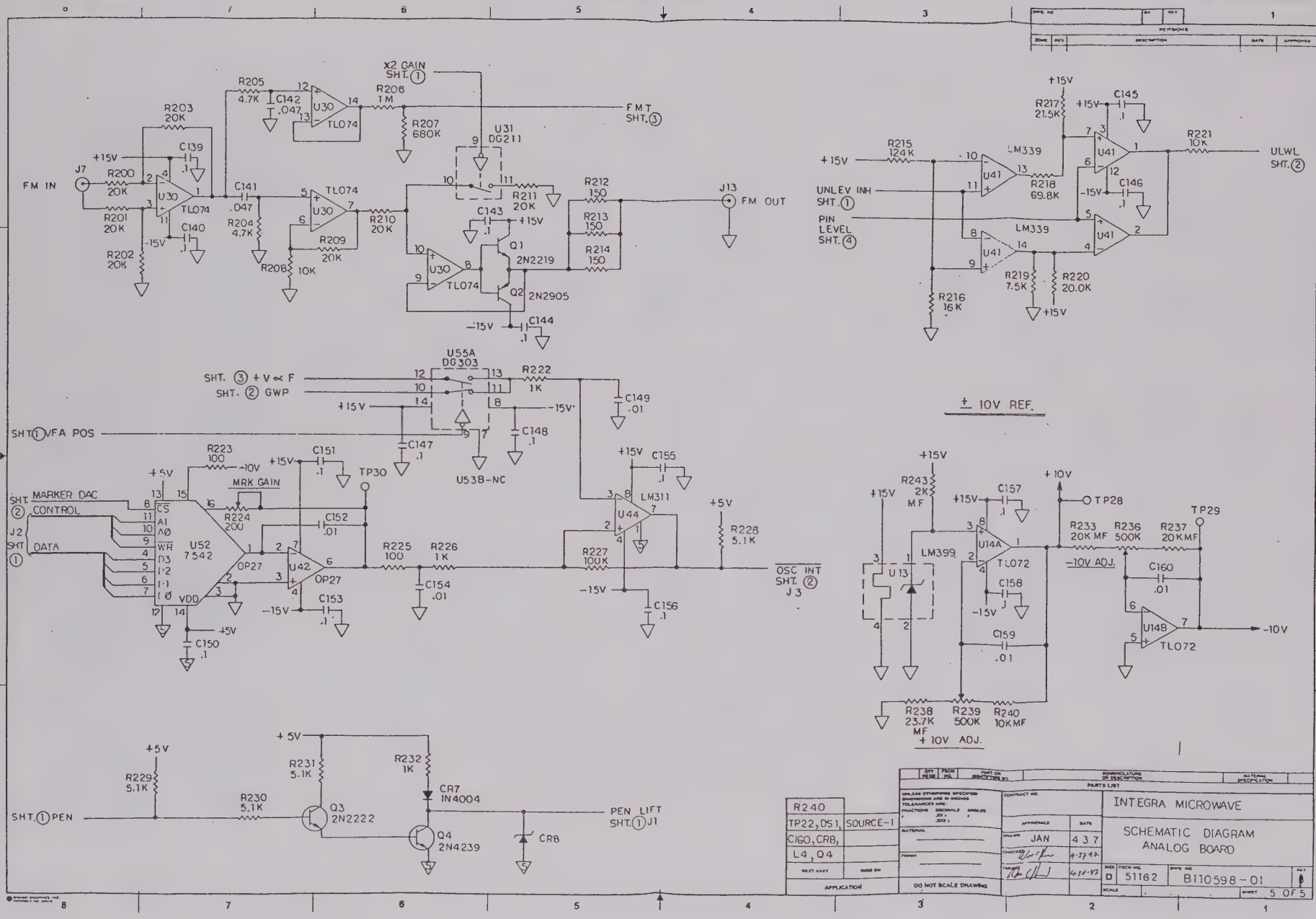
INTEGRA MICROWAVE

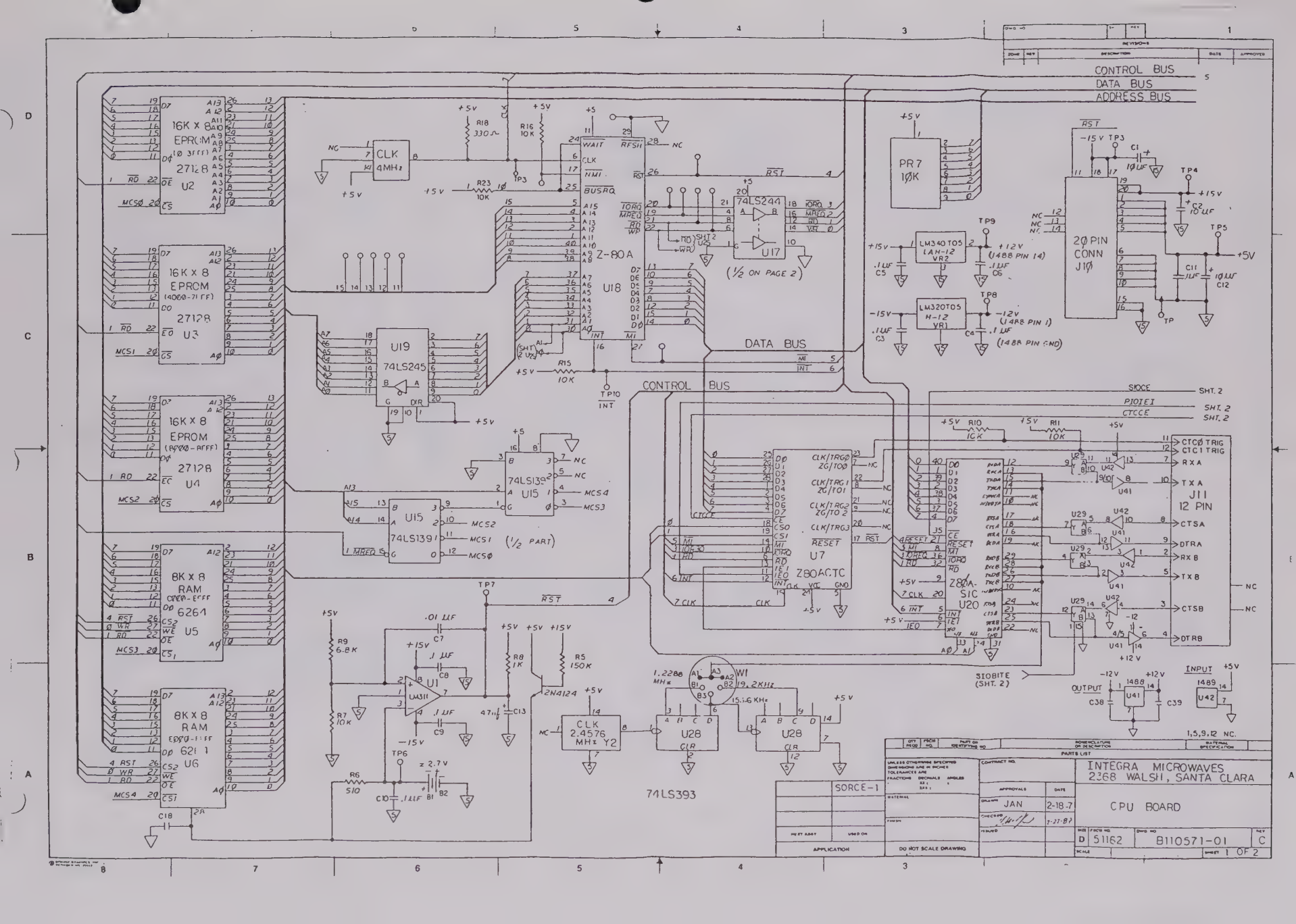
SCHEMATIC DIAGRAM
ANALOG BOARD

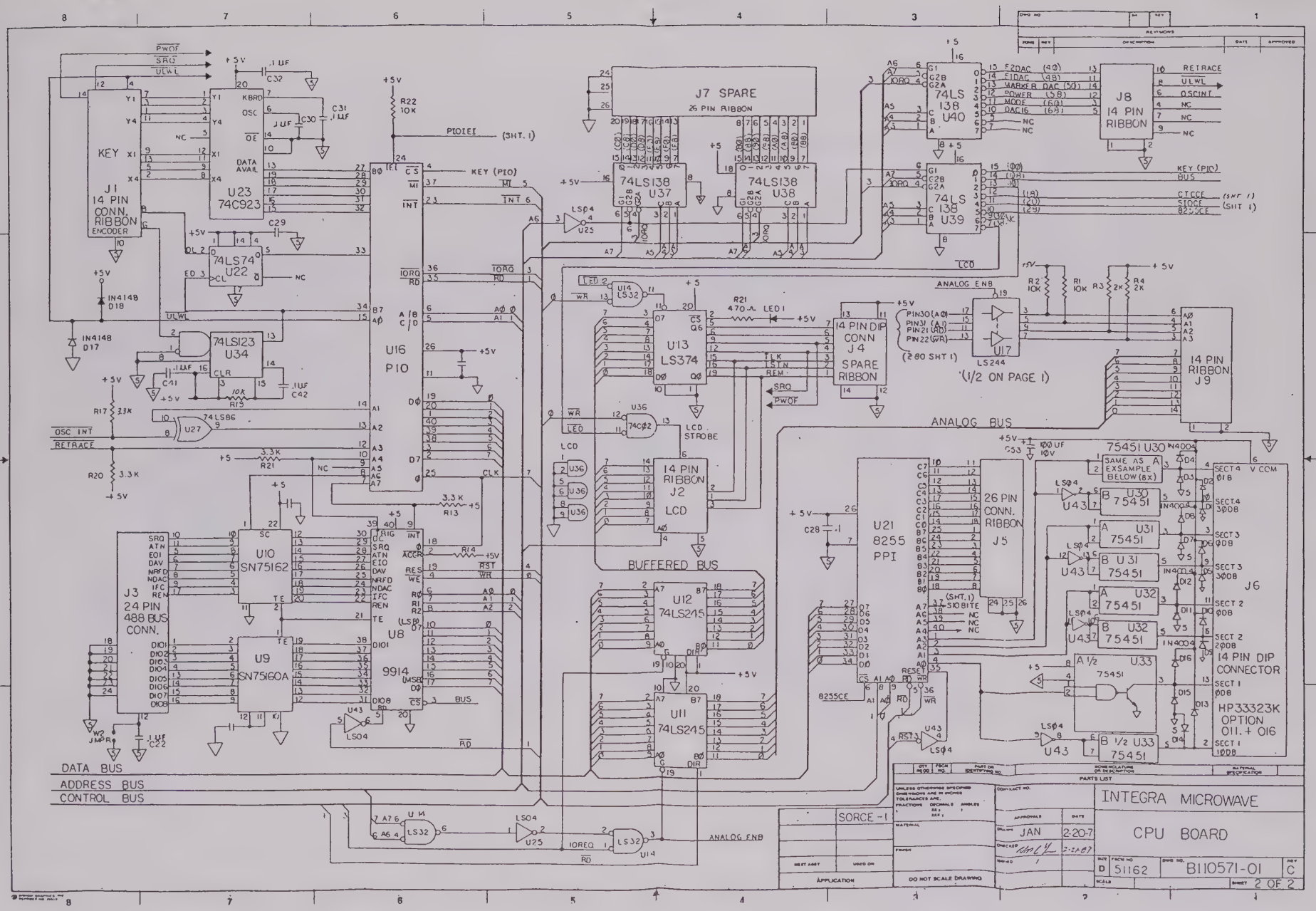
DRAWN	JAN	3-30-7	
CHECKED			
		4-3-87	

SIZE	FSCM NO.	DWG NO.	REV
D	51162	8110598-01	B
SCALE		SHEET 2 OF 5	


YTM OFFSET
YTM HYSTO (SHT. 1)
DG509 ACJ
U29 DG211
R105 100K
R106 1M
R107 20K
R241 2M
S1
±10VΔ
BP3 GAIN
BP2 GAIN
BP1 GAIN
R87 R88 19.1K 2K
R89 20K C64
R90 10K
R91 R92 19.1K 2K
R94 20K C65
R93 10K
R95 R96 19.1K 2K
R98 20K C66
R97 10K
R99 19.1K
R100 2K
MULT GAIN
U15
U25 74LS148 PRIORITY ENCODER
LM339
R71 100K
R72 100K C57
R73 100K C58
R74 100K C59
R75 34.0K
R76 5.1K
R77 5.1K
R78 5.1K
R79 1M
R80 20.0K .1%
R81 10K
R82 20.0K 1%
R83 10.0K MF
R84 4.22K
R85 6.65K
R86 10K
C71 C72 C73
U17 DG303
R108 10K
R109 20.0K
C74 C75 C76 C77 .001 C78 C79
R110 4.99K
U16 OP27
SML CAP (SHT. 1)
CAP (SHT. 1)
TP17 YTM-V
DG75451
U32A
U32B
CR3 IN4004
CR2 IN4004
K1
K2
C97 4700
C98 4700
R142 10K
R143 10K
J5 YTM + YTM −
J6 YTO + YTO −
RF POWER SHT. 1
FMT SHT. 5
−V ∝ F SHT. 1
+V & F SHT. 5
U23 OP27
U20 OP27
HIGH BAND COMP
LOW BAND COMP
U24 DG303A
R101 20K
R102 10K
R103 20K
R104 10K
C67 C68 C69 C70
X2 GAIN (SHT. 1)
YTO HYSTO (SHT. 2)
R137 100K
R138 1M
R136 20K
YTO OFFSET
U17 DG303
R139 10K
R140 20.0K
C93 C94 .001
R141 4.99K
U18
TP18 YTO-V
U27 74LS148 PRIORITY ENCODER
U28
U19
R119 R120 R121 R122 100K
R123 34.0K
R124 R125 R126 5.1K
R127 10K
R128 R129 9.53K 1K
R130 R131 9.53K 1K
R132 R133 9.53K 1K
R134 R135 9.53K 1K
C87 C88 C89 C90 C91 C92
X2 GAIN SHT. 1
X2 OFFSET
R111 20.0K
R112 20.0K
R113 1K
2X GAIN
R114 2M
R115 100K
R116 10K MF
R117 4.64K
R118 8.25K
U21 OP27
U25 OP27
C80 C81 C82 C83 C84 C85 C86
TP10 TP11 TP12 TP13 TP14 TP15 TP16
BP3 FREQ
BP2 FREQ
BP1 FREQ
BP3 COMP
BP2 COMP
BP1 COMP
(TP18) SOURCE-1
(C98)
(R143)
INTEGRA MICROWAVE
SCHEMATIC DIAGRAM
ANALOG BOARD
PARTS LIST
DO NOT SCALE DRAWING
JAN 4-28-87
D 51162 B110598 01 B
SHEET 3 OF 5

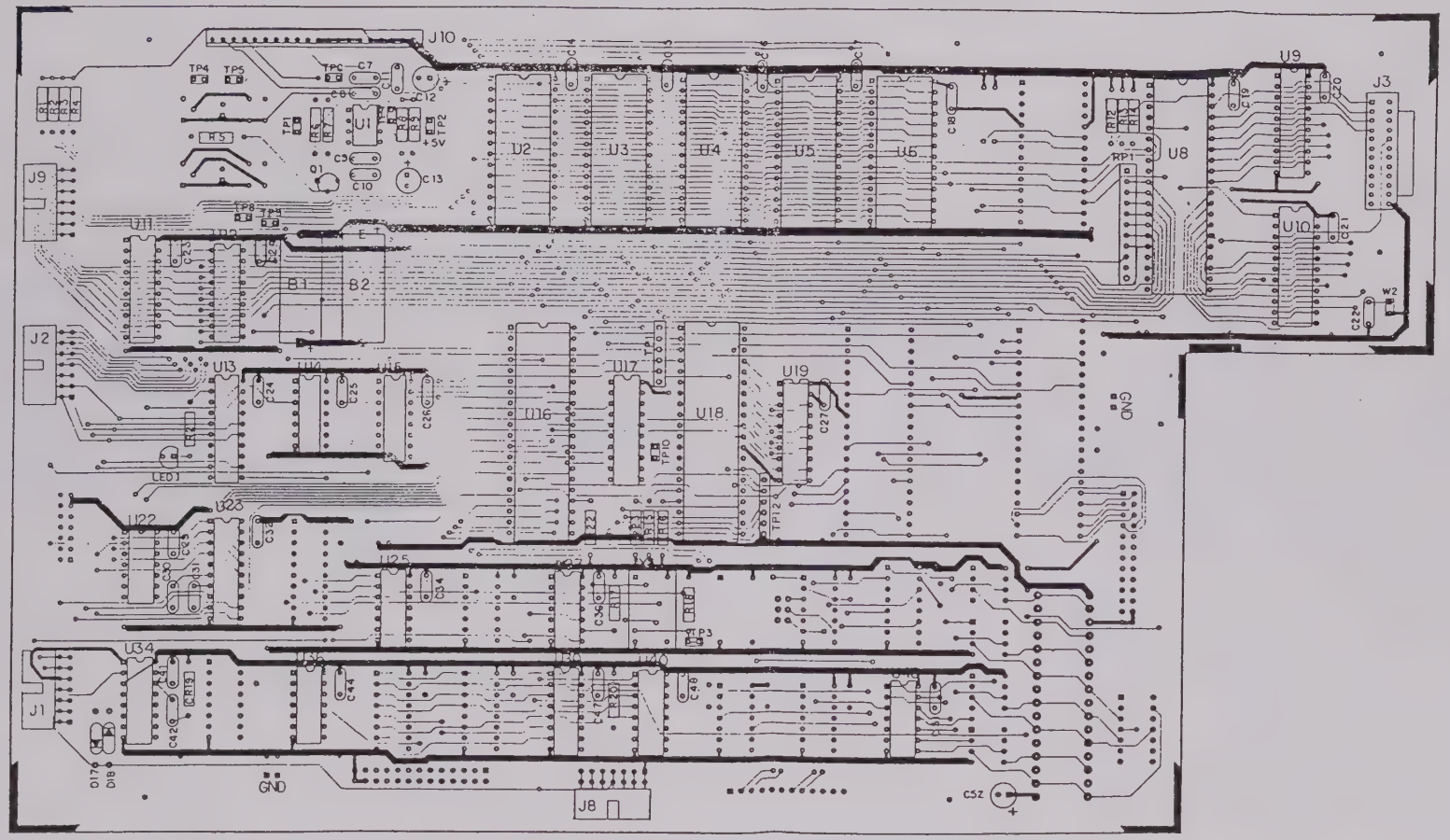

X2 GAIN SHT. 1
FM IN
J7
R205 4.7K
C142 .047
U30 TL074
R206 1M
FMT SHT. 3
R203 20K
C139 .1
+15V
R200 20K
R201 20K
C140 .1
-15V
R202 20K
C141 .047
R204 4.7K
R208 10K
R209 20K
R210 20K
U31 DG211
R211 20K
R212 150
R213 150
R214 150
J13
FM OUT
C143 .1
Q1 2N2219
Q2 2N2905
C144 .1
+15V
R215 124K
UNLEV INH SHT. 1
PIN LEVEL SHT. 4
R216 16K
LM339
U41
R217 21.5K
C145 .1
R218 69.8K
C146 .1
R219 7.5K
R220 20.0K
R221 10K
ULWL SHT. 2
U55A DG303
SHT. 3 +V ∝ F
SHT. 2 GWP
R222 1K
C149 .01
C147 .1
C148 .1
U53B-NC
SHT 1 VFA POS
± 10V REF.
MARKER DAC
CONTROL
DATA
SHT 2
J2
SHT 1
U52 7542
OP27
U42
R223 100
MRK GAIN
R224 200
C151 .1
TP30
C152 .01
C153 .1
C154 .01
R225 100
R226 1K
C150 .1
+5V
-10V
R227 100K
LM311
U44
C155 .1
C156 .1
R228 5.1K
OSC INT SHT. 2 J3
R243 2K MF
C157 .1
U14A TL072
TP28
TP29
R233 20K MF
R236 500K
R237 20K MF
-10V ADJ.
C160 .01
C158 .1
C159 .01
U148 TL072
U13 LM399
R238 23.7K MF
R239 500K
R240 10K MF
+10V ADJ.
R229 5.1K
R230 5.1K
R231 5.1K
R232 1K
Q3 2N2222
CR7 IN4004
Q4 2N4239
CR8
SHT. 1 PEN
PEN LIFT SHT. 1 J1
R240
TP22, DS1, SOURCE-1
C160, CR8,
L4, Q4
APPLICATION
DO NOT SCALE DRAWING
INTEGRA MICROWAVE
SCHEMATIC DIAGRAM
ANALOG BOARD
D 51162
B110598-01
SHEET 5 OF 5


CONTROL BUS
DATA BUS
ADDRESS BUS
16K X 8 EPROM (0-3FFF) 2712B U2
16K X 8 EPROM (4000-7FFF) 27128 U3
16K X 8 EPROM (8000-BFFF) 27128 U4
8K X 8 RAM (C000-DFFF) 6264 U5
8K X 8 RAM (E000-FFFF) 6211 U6
CLK 4MHz
Z-80A U18
74LS244 U17
(1/2 ON PAGE 2)
U19 74LS245
74LS139 U15
(1/2 PART)
Z80ACTC U7
Z80A-SIO U20
PR7 10K
20 PIN CONN J10
LM340T05 LAH-12 VR2
LM320T05 H-12 VR1
+12V (1488 PIN 14)
-12V (1488 PIN 1)
(1488 PIN GND)
J11 12 PIN
CTC0 TRIG
CTC1 TRIG
RXA
TXA
CTSA
DTRA
RX B
TX B
CTSB
DTRB
INPUT
OUTPUT
CLK 2.4576 MHz Y2
74LS393
2N4124
LM311
SIOBITE (SHT. 2)
SIOCE SHT. 2
PIOIEI SHT. 2
CTCCE SHT. 2
1,5,9,12 NC.
SORCE-1
INTEGRA MICROWAVES
2368 WALSH, SANTA CLARA
CPU BOARD
D 51162 B110571-01 C
SHEET 1 OF 2


J1 14 PIN CONN. RIBBON ENCODER
KEY
U23 74C923
74LS74 U22
74LS123 U34
U16 P10
74LS86 U27
U10 SN75162
U9 SN75160A
U8 9914
J3 24 PIN 488 BUS CONN.
J7 SPARE 26 PIN RIBBON
74LS138 U37
74LS138 U38
74LS 138 U40
74LS 138 U39
J8 14 PIN RIBBON
J9 14 PIN RIBBON
U13 LS374
14 PIN DIP CONN J4 SPARE RIBBON
U17 LS244
U14 LS32
U36 74C42
14 PIN RIBBON J2 LCD
U12 74LS245
U11 74LS245
U21 8255 PPI
26 PIN CONN. RIBBON J5
75451 U30
75451 U31
75451 U32
75451 U33
14 PIN DIP CONNECTOR
J6
HP33323K OPTION 011 + 016
U25 LS04
U43 LS04
DATA BUS
ADDRESS BUS
CONTROL BUS
ANALOG BUS
BUFFERED BUS
ANALOG ENB
LCD STROBE
(1/2 ON PAGE 1)
INTEGRA MICROWAVE
CPU BOARD
B110571-01
SHEET 2 OF 2

DWG NO	REV

REVISIONS				
SHEET	REV	DESCRIPTION	DATE	APPROVED
ALL	C	BOARD CHANGE LAYOUT	5-3-87	



QTY REQD	ITEM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION
			PARTS LIST	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ±1/32 DECIMALS .03 ± ANGLES ±1°
.XXX ± .005

CONTRACT NO.

APPROVALS	DATE
DRAWN JAN	4-16-7
CHECKED	
ENGR'D	

INTEGRA MICROWAVE

CPU BOARD, ASSEMBLY DRAWING

SOURCE-1

MATERIAL

FINISH

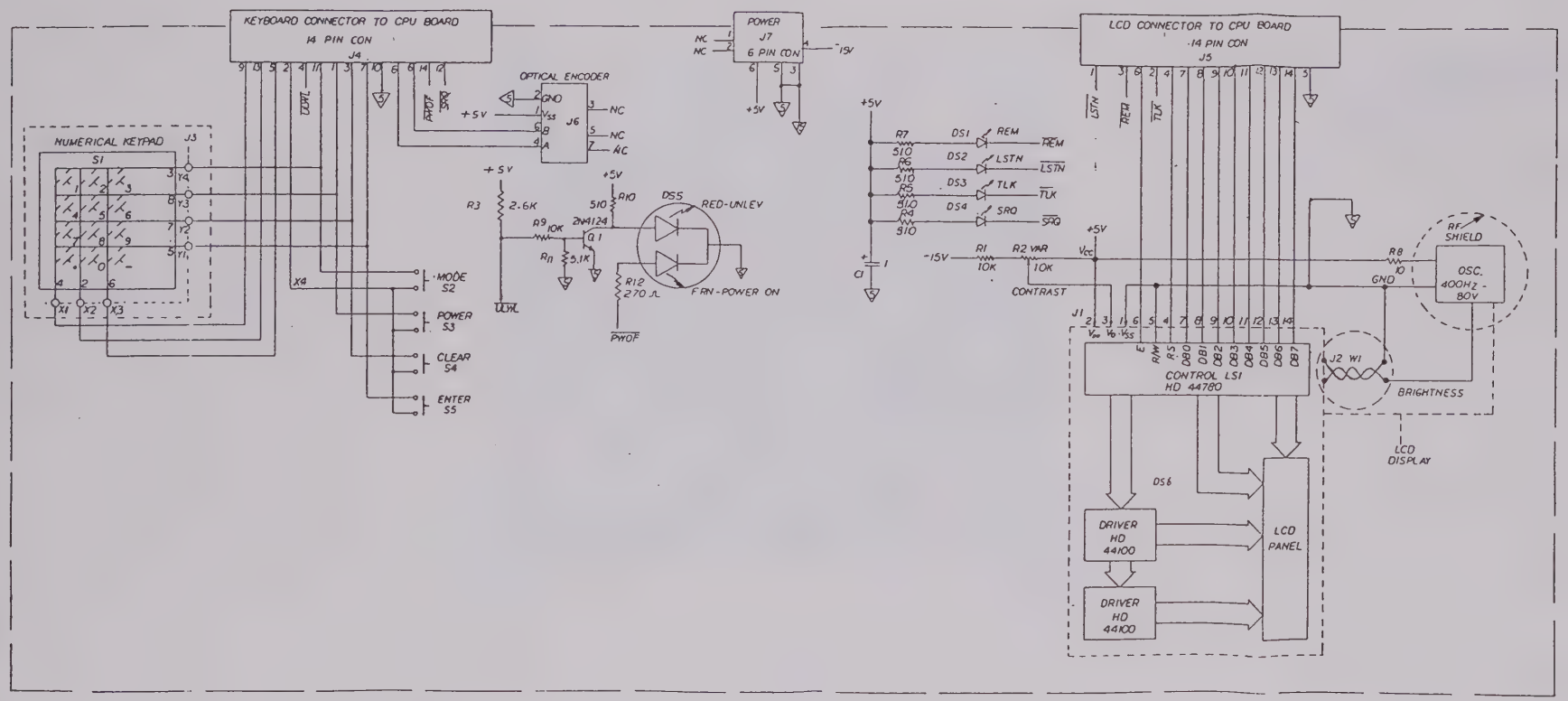
NEXT ASSY | USED ON

APPLICATION

DO NOT SCALE DRAWING

SIZE D | FSCM NO 51162 | DWG NO B31057I-01 | REV C

SCALE | SHEET



LAST USED: R12, DS7, J7, C1, Q1

P-C	A	INITIAL RELEASE	11-23-87		
	B				

SOURCE 1	
MATERIAL	SEE PART LIST
FINISH	
NEXT ASSY	USED ON
APPLICATION	DO NOT SCALE DRAWING

DRAWN		11-23-87
CHECKED		
ENG APPR.		11-24-87

INTEGRA MICROWAVE
2368 WALSH AV. SANTA CLARA, CA.

SUB PANEL

SIZE	FSCM NO.	DWG NO.	REV
D	51162	B110592-01	B

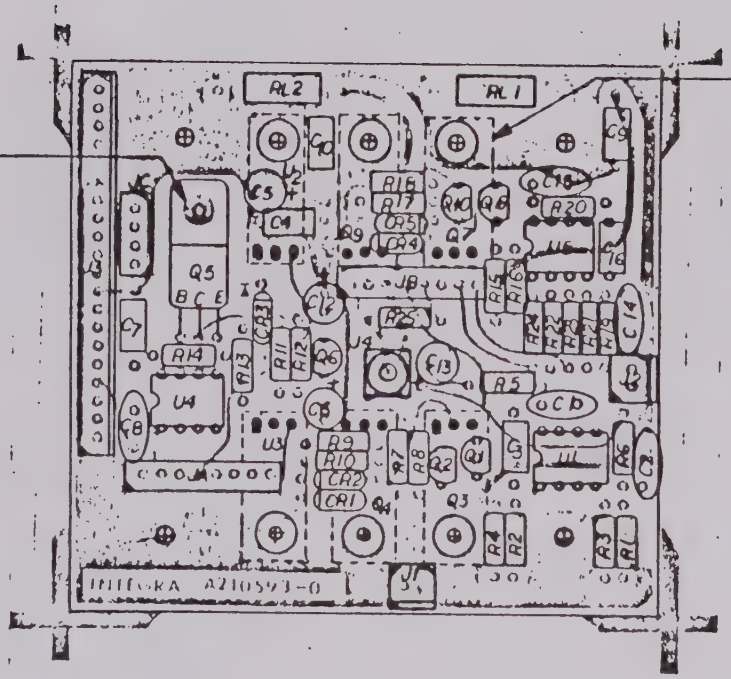
SCALE — SHEET

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

① # 4-40 X 1/4

② # 4 LOCK

③ # 4 NUT



NOTE: U2, U3, Q7, Q4, Q7 AND Q9 ARE MOUNTED ON THE HEATSINK ASSEMBLY A110606-01.

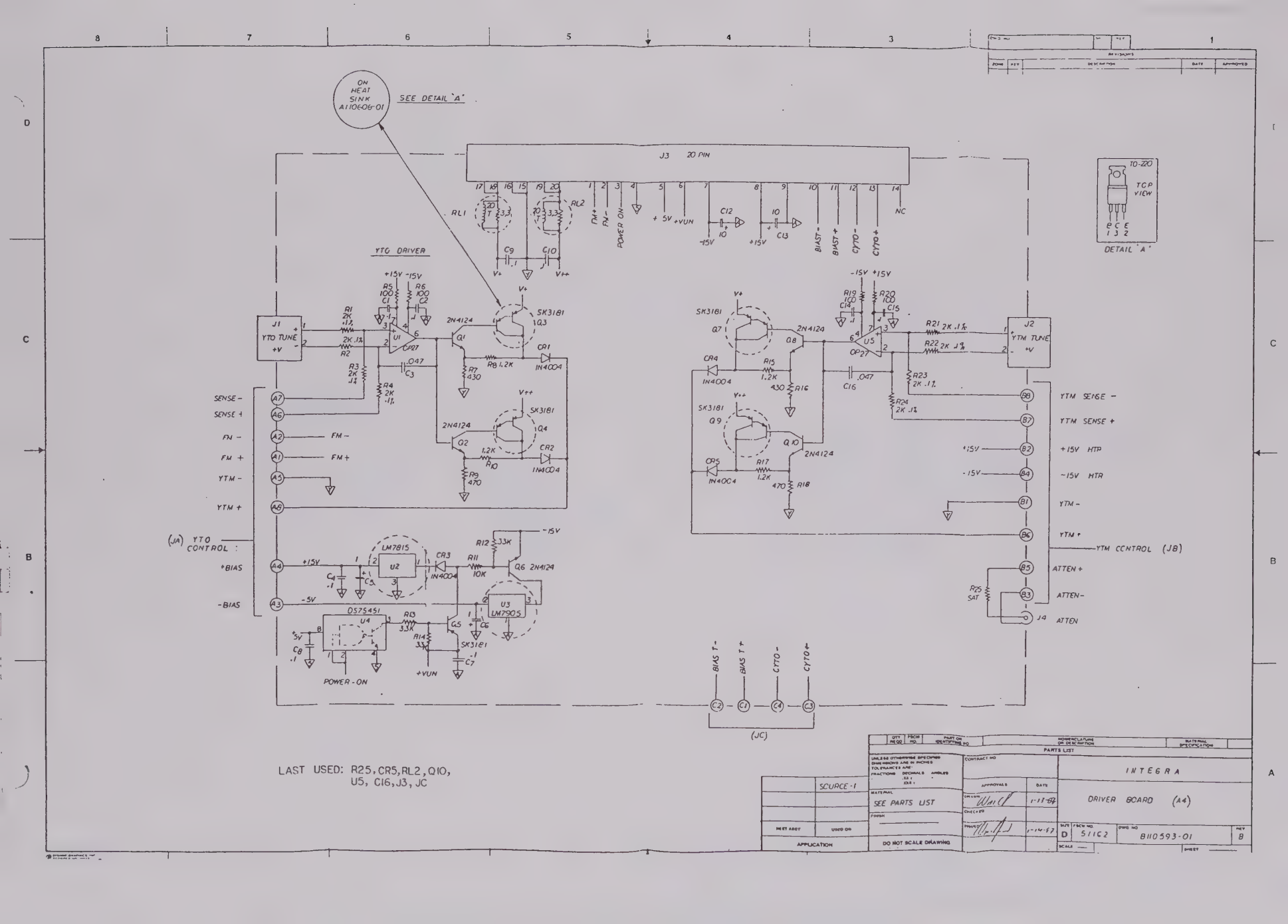
(SHOWEN HERE FOR ORIENTATION ONLY)

QTY REQD	FSCM NO.	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION
			PARTS LIST	

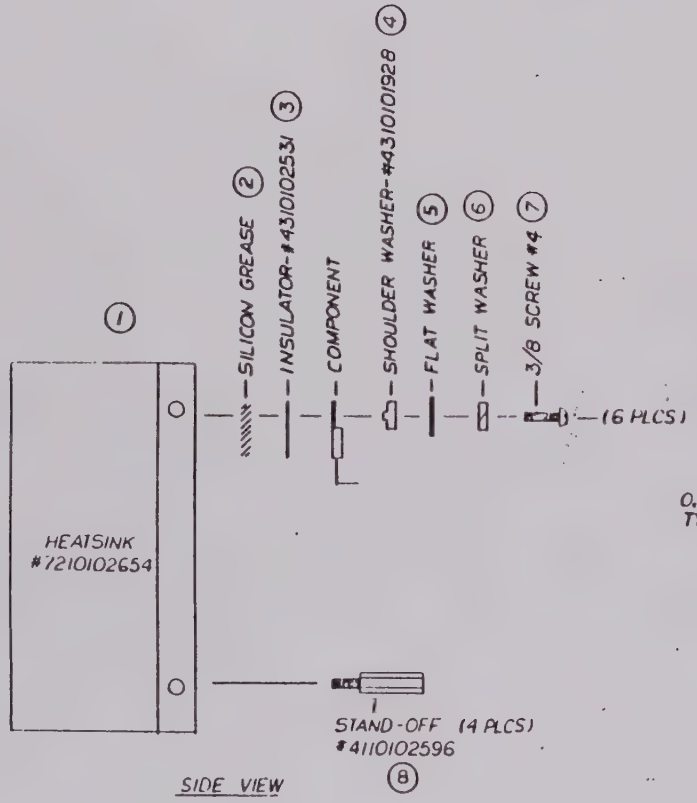
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES .XX ± .XXX ±	CONTRACT NO.		INTEGRA
MATERIAL SEE PARTS LIST	APPROVALS	DATE	DRIVER BOARD (A4)
FINISH	DRAWN	4-14-97	SIZE C FSCM NO. 51162 DWG. NO. B210593 01 REV B
NEXT ASSY USED ON	CHECKED		
APPLICATION	ENG APPR	4-14-97	SCALE SHEET
DO NOT SCALE DRAWING			

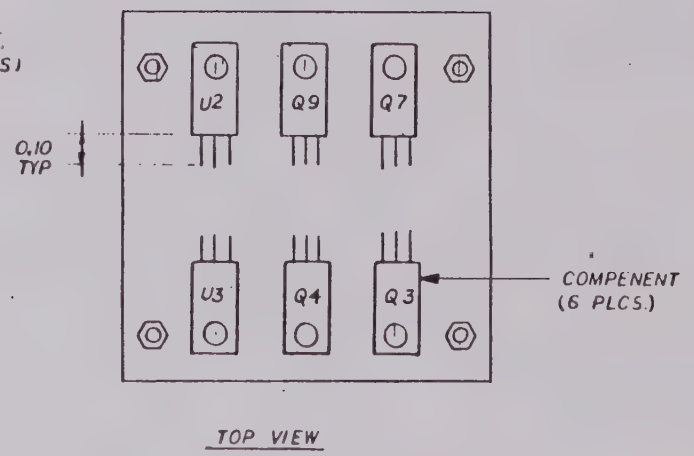
SOURCE: 1

BISHOP GRAPHICS INC RECORDER NO. 30611


ON HEAT SINK A110606-01
SEE DETAIL 'A'
J3 20 PIN
DETAIL 'A'
TO-220
TOP VIEW
YTO DRIVER
J1 YTO TUNE +V
J2 YTM TUNE +V
SENSE -
SENSE +
FM -
FM +
YTM -
YTM +
(JA) YTO CONTROL :
+BIAS
-BIAS
YTM CONTROL (JB)
ATTEN +
ATTEN-
J4 ATTEN
BIAS T -
BIAS T +
CYTO -
CYTO +
(JC)
POWER-ON
+VUN
LAST USED: R25, CR5, RL2, Q10, U5, C16, J3, JC
SOURCE-1
SEE PARTS LIST
DO NOT SCALE DRAWING
INTEGRA
DRIVER BOARD (A4)
D
51162
B110593-01
B

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	added callouts	3-3-87	[illegible]





QTY REQD	FSCM NO	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION	MATERIAL SPECIFICATION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES .XX ± .XXX ±

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO

APPROVALS	DATE
DRAWN	1-21-87
CHECKED	
ISSUED	2-10-87

SOURCE-1

NEXT ASSY | USED ON

APPLICATION

INTEGRA

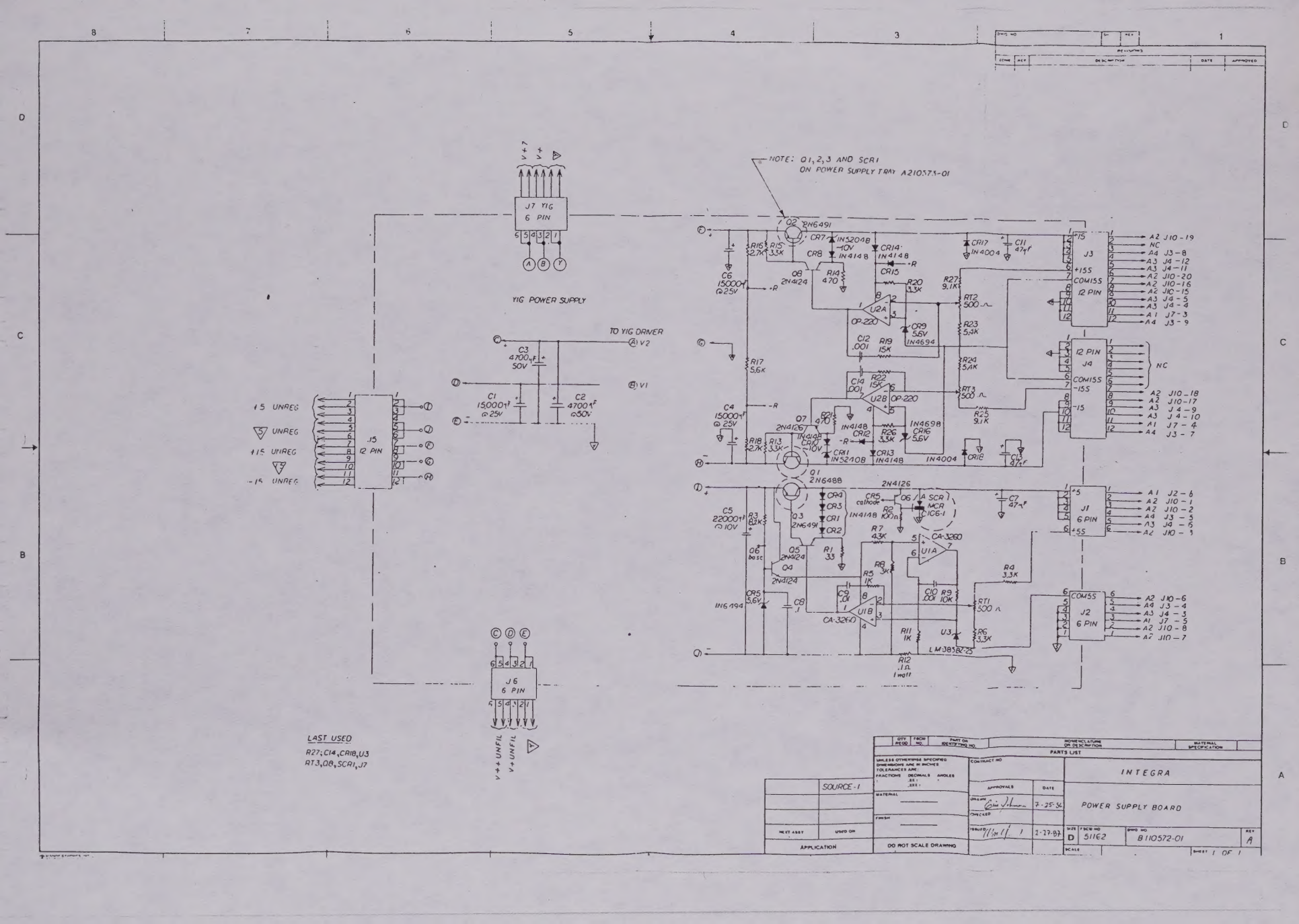
HEATSINK ASSEMBLY

SIZE	FSCM NO	DWG NO	REV
C	51162	B21C606 01	A

SCALE — SHEET

BISHOP GRAPHICS INC
REORDER NO 20511

4 3 2 1


NOTE: Q1, 2, 3 AND SCR1 ON POWER SUPPLY TRAY A210573-01
J7 YIG 6 PIN
YIG POWER SUPPLY
TO YIG DRIVER
J5 12 PIN
J6 6 PIN
J3 12 PIN
J4 12 PIN
J1 6 PIN
J2 6 PIN
LAST USED
R27; C14, CR18, U3
R13, Q8, SCR1, J7
SOURCE-1
INTEGRA
POWER SUPPLY BOARD
B110572-01
DO NOT SCALE DRAWING
APPLICATION
PARTS LIST

ACCOPRESS®

25170	YELLOW
25171	BLACK
25172	LIGHT BLUE
25173	DARK BLUE
25174	LIGHT GRAY
25175	LIGHT GREEN
25176	DARK GREEN
25177	TANGERINE
25178	RED
25179	EXECUTIVE RED

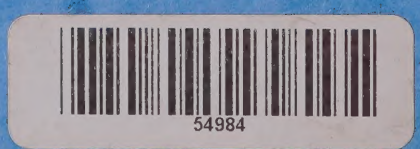
WITH WATER RESISTANT

PRESSTEX®

COVERS

ACCO®

ACCO INTERNATIONAL INC.
CHICAGO, ILLINOIS 60619


54984